



# Yatta Water Supply Project

Complementary works of Yatta Water Supply System

## Bills of Quantities

*Nov-21*

### OFFICE

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## **GENERAL PREAMBLE**

1. All work described in this project shall be implemented according to the General Technical Specifications for the Construction of concrete Water Tanks (GTS)-2003. The contractor shall read the General Technical Specifications for the Construction of concrete Water Tanks (GTS)-2003 and visit the site acquaint himself fully with the employer's requirements and with mutual obligations, the method of measurements and the detailing of unit prices.
2. All work described in this project shall be implemented according to the particular Technical Specifications.
3. The works and Price of the Contractor shall include the connection and disconnection of pipe with old and new network.
4. The As build provided to the Contractor might have some wrong information. The Contractor shall be fixable and will not have the rights to claim or object.
5. The Contractor shall keep the existing network functional during the works and shall programme his work according to Yatta Municipality instructions
6. The pipe routs and locations of the pipes and valves are tentatives . The Engineers and Yatta Municipality will mark the final routs and locations during the walk thorough and the shop drawings which will be prepared by the Contractor. The Contractor have no rights to claim or object.
7. Final quantities of the contract are the measured quantities in the presence of the contractor and the supervisor.
8. In the Bill of quantities, only the general description of the work is given, without specifying all the contractor's obligations set out in the relevant items of the (GTS).the contractor must read the BoQ and drawings in conjunction with the GTS.
9. The cost of the shop drawings and as built shall be included in the Contractor unit prices.
10. Submittals for engineer's approval of shop drawings, supplying any material needed as mentioned in the (BOQ). A shipment certificate of origin for all supplied pipes and materials must be supplied for each shipment for the contractor before starting the works on site. supply shall be done after approved shop drawing by engineer.
11. All valves' chambers are in lump sum forms. The contractor must figure out all potentially missing items(not shown) required for proper installation and operation of the valves' chambers and the cost of these items shall be deemed to be included in the unit cost of the BOQ item, no additional costs will be allowable.
12. It is the contractor's responsibility to adapt the chambers to the excavated area and execute all required works to secure the manholes and prevent any settlement which may occur due to weak soils or clays at the excavation base. These works are considered subsidiary works which shall be deemed to be included in the BOQ.

13. In cases where the water table is high, or the presence of clay soils which is incapable of draining water, the contractor must execute all required works to plug water from entering the manhole and to prevent floatation of manhole. The cost of these works shall be deemed to be included in the BOQ.
14. In cases where there is an indication for using precast manholes for valves, and it came out that using the precast manholes is impossible, the contractor must cast the manhole in situ without any extra cost.
15. All works, material, products, etc, should be according to the references, and standards specified in these project documents or should be according to the equivalent standards.
16. The GTS is the General Technical Specification of the Palestinian Water Authority.
17. The epoxy coating used shall be nontoxic, solvent free and 100% solid.
18. All reinforcing steel for manholes should be; deformed bars, yielding strength of 4200 kg/ cm<sup>2</sup> according to ASTM A615 or equivalent.
19. The contractor must do complete leak and Hydrostatic pressure tests of all pipelines and valves, also he must do cleaning and disinfection of the water network all according to specs, engineers approval and standards.
20. All Manhole reinforced concrete should be: fair-face, isolated with two cold bitumen layers where is buried, the 28 - compressive strength not less than 300kg/cm<sup>2</sup>.
21. Working pressure for all fittings must be as its specified in the BoQ and the Drawings
22. Pipes, fittings, valves, accessories, and specials, including protective coatings and joints materials ...etc., should be according to the latest editions of standards and references specified in the projects documents, or should be equivalent to these standards and references. The contractor should at his own expense confirm this equivalence.
23. Buried concrete surfaces should be isolated with two layers of cold bituminous protective coating (Total Thickness =1000 µm for each layer).
24. Pipes, fittings, valves, accessories, and specials including their protective coating and joints materials ...etc, that will or may come into contact with potable water should not constitute a toxic hazards, should not support microbial growth, should not cause taste or odor, cloudiness or discoloration of water, and should be approved by a recognized certifying authorities as being suitable for use in portable water supply systems.
25. Plastic Warning Tape Specifications(for steel & DIP):
  - One layer of continuous plastic blue warning tape marked "Water" or "Water Pipe ".
  - Inert polyethylene, impervious to known alkalis, acids, chemical reagents, and solvents likely to be encountered in soil.
  - Thickness: Minimum 0.1 mm (4 mils).
  - Width : 150 mm

- Identifying Lettering: Minimum 25 mm high, permanent black lettering imprinted continuously over entire length.

26. All Chamber covers for pipes diameters above 2" should be heavy duty Cast Iron with lockable key (40 tons) according to EN 124 or equivalent and with clear opening 60 cm. and for pipe diameters equal or less than 2" should be heavy duty Cast Iron with lockable key (25 tons) according to EN 124 or equivalent and with clear opening 34 cm.
27. Residential mechanical water meter shall be volumetric type, class "C" as a minimum, PN16 bar, dry dial register, magnetic transmission, water meter body material shall be bronze, brass or copper, the water meter shall be equipped with a built-in strainer, built-in non-return valve of a suitable and rigid material for potable water, gaskets, records, connectors and all required fittings to install the water meter as shown on the drawings. The water meter shall read in cubic meter and decimals in liters. The water meter, Q3 and other parameters shall be according to ISO 4064 or equivalent. The water meter diameter shall be as specified in the Bill of Quantity (BOQ).
28. Gate valves for pipe more than 2" must be cast iron, non toxic factory epoxy internally and externally coated, complete with flanges, gaskets, bolts and nuts, non rising stem, with hand wheel for each valve. All in accordance with ISO No.5752, EN1074 parts 1, 2 , EN 1171 or equivalent.
29. Gate valves for pipe less than or equal 2" must be bronze threaded gate valves (non rising stem) , (PN 20 bar min W.P) with hand wheel for each valve. All in accordance with EN 12288 or equivalent.
30. Oil filled Pressure Gauge (0-16) . The wetted parts of the gauge should be stainless steel , all in accordance with EN 837-1 or equivalent.
31. Air Release Valve Units for pipe more than 2" must be cast iron double (automatic and kinetic air valve), combination air valve (3 functions air release during filling, admission of air during drainage and air release during operation in pressurized system) for 16 bar (W.P) , complete with flanges, gaskets, bolts and nuts, non toxic factory epoxy coated, according to EN 1074-4 or equivalent.
32. Air Release Valve Units for pipe less than or equal 2" must be metal body or equivalent, double (automatic and kinetic air valve) combination Air valve (3 functions air release during filling, admission of air during drainage and air release during operation in pressurized system)
33. Check valve must be cast iron, swing check valve (non Return Valve) with extended arm (lever), counter weight and lid (cover), PN 16 bar (W.P) in accordance with EN 12334, EN 1074-3, EN 16767 or equivalent standard, complete with flanges, gaskets bolts and nuts, non toxic factory epoxy internally and externally coated.
34. Dresser shall be completed with the needed tie rod and ears for each dresser according to Nominal Pressure and manufacture recommendation.
35. Tees, elbows, reducers for pipes diameter > 2 shall be black steel with inside cement mortar lining, PN16 W.P.
36. Tees, elbows, reducers for pipes diameter  $\leq 2$  shall be galvanized steel, PN16 W.P.

37. After finishing all the works and before the final payment, the contractor has to submit as built up drawings for the project on the form of computer desk, the tracing paper and two copies which must be checked by a licensed surveyor and approved by the supervisor engineer. No payment for this item to the contractor.
38. The contractor shall submit to the engineer shop drawing and samples and, catalogs, origin Certificate for the materials and material submittals for approval before execution any item of the works mentioned in the BOQ.
39. The contractor has to submit to the engineer a shipment certificate for all supplied pipes and materials with origin certificate for each shipment. Without these certificates the invoices will not be transferred for payment.
40. The contractor is not entitled to claim changes in the unit prices in the event that there will be change in the route or locations of the pipelines for technical reasons that will appear during execution.
41. The diameter of the needed pipelines in this (BOQ) and (DWG's) is the nominal diameter of the pipe. The outside and inside diameters shall be according the Palestinian Standard (P.S) No.186 for pipes >2" and (P.S) No. 141 for diameters less or equal 2"
42. Base course sieve analysis. specifications and requirement:

Class	Sieve No.	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#200
A	%	100	100	75-100	60-90	45-80	40-70	30-65	20-40	8-20	5-10
B	passing	100	70-100	55-85	55-80	-	40-70	30-60	20-50	10-30	5-12

Class A : Granular fill Class A to be used around structure and for pavements in layers 200 mm thickness (measured before compaction) , and compacted to 100 % according to AASHTO T191, T180 or ASTM D 1557, ASTM D 1556 or equivalent. Tests shall be carried on the contractor's own expense.

Class B, to be used under structures, slabs, pavements,...etc in layers 200 mm thickness (measured before compaction), and compacted to 100 % according to AASHTO T191, T180 or ASTM D 1557, ASTM D 1556 or equivalent. Plate bearing test, for bearing capacity and settlement evaluation to be done according to AASHTO T 235 or ASTM D 1194 or equivalent. Tests shall be carried on the contractor's own expense.

BaseCoarse Material - Standards and Specification						
No.	Test Type (name)	Unit	Limits	Standards		Remarks
				ASTM	AASHTO	
1	Liquid Limit	%	25 max	D4318	T 89	AASHTO T 89 for liquid limit only
2	Plastic Limit	%	---	D4318	T90	
3	Plasticity Index	%	2--6	D4318	T90	
4	Maximum Dry Density	g/cm3	2.1 min	D1557	T180	
5	Optimum Moisture Content	%	-----	D1557	T180	
6	Sand Equivalent Value	%	35 min	D2419	T176	
7	Passing Sieve # 200	%	See Specs	C 136	T 27	Test method ASTM C 117 or AASHTO T11 also shall be used for material finer than 75µm (No.200) sieve in conjunction with ASTM C136 or AASHTO T 27
8	Los Anglos Abrasion (Resistance to Abrasion)	%	45 max	C131	T96	The loss in weight shall not exceed 45% after 500 revolutions
9	Sieve Analysis	-----	See Specs	C 136	T 27	Test method ASTM C 117 or AASHTO T11 also shall be used for material finer than 75µm (No.200) sieve in conjunction with ASTM C136 or AASHTO T 27
10	C.B.R (California Bearing Ratio) @ 100% of Max Dry Density)	%	80 min	D1883	T193	
11	Ratio Of Wear Loss	-----	0.2 max	C131	T96	The ratio of the loss after 100 revolutions to the loss after 500 revolutions should not greatly exceed 0.20 for material of uniform hardness
12	Elongated And Flaky Particles	%	35 max	D4791		Test if for single size gravel only

43. Exact alignment of the Transmission Pipe Line/ water distribution lines will be in accordance with Engineer's approval and the other relevant parties.
44. All welded joints shall be done according to the GTS
45. The Contractor shall provide and maintain suitable and sufficient shelters and mess rooms for his workmen and supervisory staff as are customary and necessary.
46. The Contractor shall provide at all construction sites sufficient closets or latrines to comply with Government Regulations. They shall be properly screened and maintained in a clean and sanitary state at all times.
47. The contractor shall submitted a traffic control plan prior to construction for the protection of traffic in public or private streets and ways, the CONTRACTOR shall provide, place, and maintain necessary barricades, traffic cones, warning signs, lights, flagmen, and other safety devices and staff in accordance with the requirements of the applicable local authorities.

48. The CONTRACTOR shall take necessary precautions for the protection of the WORK and the safety of the public. Barricades and obstructions shall be illuminated at night, and lights shall be kept burning from sunset until sunrise.
49. The CONTRACTOR shall station such guards or flaggers and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. Signs, signals, and barricades shall conform to the requirements of Subpart G, Part 1926, of the OSHA Safety and Health Standards for Construction
50. All civil, mechanical and miscellaneous work items mentioned hereinafter for all project facilities and units shall include supply, delivery installation, adjustment, testing commissioning, as built drawings and all required materials, equipment and workmanship to execute the items of construction in accordance with the specifications, drawings, and Engineer instructions, complete in place and ready for handing over. Measurements and payment shall be described in the relevant documents. Prices must include shop drawings for all works that should be submitted by the contractor and to be approved by the supervisor Engineer before starting works.
51. Quality of Pipes, Fittings, Accessories and Specials  
Contractor shall have a Quality Assurance System including:
- Records of tests performed by manufacturers on materials brought in.
  - Sequential numbering of pipes and fittings.
  - All goods or materials supplied by the Contractor shall be new of first class quality and of the best workmanship and design.
- The quality assurance system records shall be open to inspection by the Engineer, and shall be maintained in such a way that any pipe or fittings is identified by a unique sequential production number and can be uniquely related to each stage of its manufacture including material origin and quality, date and time of each operation, operator(s) involved and results of relevant quality tests."
52. Testing of materials should be according to the Relevant Standards.
- The Contractor shall pass a complete set of the quality assurance records to the Engineer.
- Pipes, fittings, accessories, and specials including their protective coating and joints materials, that will or may come into contact with potable water shall not constitute a toxic hazards, shall not support microbial growth, shall not cause taste or odor, cloudiness or discoloration of water, and shall be approved by a recognized certifying authorities as being suitable for use in portable water supply systems.
  - Pipes, fittings, accessories and specials are recommended to be furnished by a single Manufacturer.
53. Contractor shall submit to the supervisor engineer a daily report show the progress of the work and the anticipated work within the next day.
54. Upon completion of the work the Contractor should supply to the Engineer one original As built drawings and five blue print copies for the whole installation works system in addition to one digital copy.

55. Contractor shall submit to the supervisor engineer a periodic cash flow show the flow of money from the owner to the contractor in the form of progress payments. The projection of income and expense during the life of the project.

56. Asphalt specifications as follows:

- Spraying 2 kg of prime coat(MCO) per each square meter over the compacted base course, and applying a layer of asphalt mix of size  $\frac{3}{4}$ " , in a thickness not less than 50mm, after compaction which should satisfy the specification of Palestinian Ministry of Public Works.
- Asphalt pavement shall be compacted to 98% according to AASHTO T 166 or AASHTO T230 or equivalent.
- Asphalt works is not limited to a location or type. The Contractor with the Municipality shall verify the locations and do the designs for the implementation of the asphalt reinstatement for a trench or a single lane.

57. Flow Instruments:

- **Electromagnetic Flow Meters:**

- A. The electromagnetic flow meter shall be according to ISO 4064, OIML R49 or equivalent.
- B. Magnetic flow meter systems shall be the low frequency electromagnetic induction type which produces a DC pulsed signal directly proportional to and linear with the liquid flow rate. Complete zero stability shall be an inherent characteristic of the flow meter system. Each magnetic flow metering system shall include furnishing a metering tube, signal cable, transmitter, flow meter grounding rings, transmitter enclosures, antennas, external batteries and all related items.

1. The metering tube shall have:
  - a. Pressure ratings as indicated and in accordance with the requirements of piping specifications.
  - b. EPDM or Butyl Rubber Liner, conforming to the manufacturer's recommendation for the intended service.
  - c. Electrodes shall be Hastelloyor Higher grade
  - d. Metering tube housing rated for IP68, suitable for continuous submergence in up to 3 meters of water, if installed in a below grade vault or any other area with reasonable potential for submergence.
  - e. Epoxy protective coating.
  - f. Grounding rings shall be 316 stainless steel. Grounding rings shall be designed to protect and shield the liner's edge interface from abrasion at the meter end.
2. The microprocessor-based signal converter/ transmitter shall have:
  - a. DC pulse technique to drive flux-producing coils.
  - b. Six-digit LCD displays for flow rate, percent of span, and tantalization.
  - c. An operator interface with keypad which responds to English text entry.
  - d. Automatic range change.
  - e. Capable of measuring flow in both directions.
  - f. 3 totalizer: Configurable to Forward, Reverse and Bidirectional net flow.
  - g. Programmable parameters including meter size, full scale Q, magnetic field frequency, primary constant, time constant.
  - h. Data retention for a minimum of 5 years without auxiliary power from main source or battery.
  - i. Self-diagnostics and automatic data checking.



- j. Ambient temperature operating limits of -20 to 60 degrees C.
- k. Remote transmitter enclosure rated for IP68.
- l. Data transmitter and flow meter shall be provided from the same manufacture.
- m. Transmitter for flow meter with 2 input 1st for flow sensor & 2nd for pressure sensor.

#### C. Calibration

Calibration: Each flow metering system shall be hydraulically calibrated at a facility that is traceable to the ISO 4185-1980.

#### D. The flow metering system shall conform to the following:

- 1. Accuracy:  $\pm 0.2\%$  of flow rate from full scale.
- 2. Environmental Limits: - 20 to +60° C.
- 3. Power requirements: AC+ external battery with minimum 7 years life.

#### E. The flow meter shall be furnished with the following accessories:

- 1. Furnish remote mount flow transmitter with a sufficient cable.
- 2. Provide stainless steel stanchions for mounting of remote transmitter no less than 4 feet above grade.
- 3. Provide manufacturer digital calibration verification unit with necessary accessories to interface with the furnished magnetic flow meter.

#### F. GSM/GPRS/3G Communications:

- 1. The magnetic flow meter shall be a battery operated, stand-alone water meter capable of GSM/GPRS/3G communications using commercially available cellular data service. An external battery shall be supplied with the meter to extend service life to at least 7 years.
- 2. The magnetic flow meter shall also be capable of operating on 230 or 24 volts ac, 50 Hz. The meter shall be equipped with EEPROM memory to prevent data loss.
- 3. GSM/GPRS/3G communications hardware shall allow the meter to transmit flow rate, totalized flow, pressure data, alarms and time-stamped stored process data over a third-party cellular network to the WBWD. The communications hardware shall be integral to either the flow meter or signal converter.
- 4. A high gain remote antenna shall be supplied with the meter that will allow data to be transmitted via GSM/GPRS/3G technology.
- 5. GSM/GPRS/3G modem must support Remotely commands for on demand data, on demand device health (Battery status, Battery Health, Flow rate, totalizer, etc...) and on demand actions by mean of SMS or by Email.
- 6. The GSM/GPRS/3G module shall be programed to send the data once a day or as required by the Engineer.

#### G. PRODUCTS:

**GENERAL:** The following paragraphs provide minimum device requirements.

##### I. Interconnecting Cable.

- 1. Interconnecting cable from the sensor to the transmitter shall be provided.
- 2. The cable shall be the type approved by the instrument manufacturer for the intended purpose of interfacing the element to the transmitter.
- 3. Length of cable shall be a minimum of 5 meters.

#### H. Integration with SCADA system.

- 1.1. The flow meters shall be capable to send data to the control room at WBWD office, Ramallah.

- 1.2. Flow meters shall be capable to be integrated with WBWD SCADA software and reporting system.
- 1.3. Must include lifetime software or tools to be integrated with SCADA and reporting system.

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Must include lifetime software or tools to be integrated with SCADA and reporting system.

Summary		Priority 1 (Firm)
No.	Items	Total (NIS)
1	Preliminary Works: Mobilization and Demobilization	
2	Provisional Items/ Day Works	
3	YATTA TRANSMISSION MAINS & DISTRIBUTION NETWORKS- Supplementary Works	
4	Pavement repair and reinstatement	
5	Complementary Works: Beit Ammra 500m3 Elevated Tank	
6	Complementary Works: School Tank 1000m3 Reservoir	
7	Complementary Works: Khalet Salem 5000m3 Reservoir	
8	SCADA Work for WBWD	
9	SCADA Work for Yata Municipality	
10	DISTRIBUTION NETWORKS- Extension area	
11	Spare Parts	
12	Provisional Sum Item	15,000
<b>Total</b>		

The Contractor shall read in addition to all BOQ items the preamble of the BOQ. The preamble shall be signed and shall

**Total Price in Words**

N°	TITLE	UNIT	QUANTITIES	UNIT PRICE (NIS)	Total AMOUNT (NIS)
THE COSTS PROVIDED BY THE CONTRACTOR IN THIS BILL OF QUANTITIES ARE ALL INCLUSIVE FOR THE WORK DESCRIBED IN THE DRAWINGS AND SPECIFICATIONS, WHETHER SPECIFICALLY MENTIONED IN THE BELOW DESCRIPTIONS OR NOT.					
<b>1. Preliminary Works: Mobilization and Demobilization</b>					
1.1	Mobilization as described in the preamble of this document, and as per general and technical specifications ( incl. staff offices, storage areas, fencing, guarding, transport of all required equipment, preparation activities, etc.). - also included here are all financial and insurance costs; insurances, permits, any costs for bank guaranties, etc.	L.S	1		
1.2	Allow for every expenses and works to remove carefully any obstacles such as trees, fences, old culverts, steel structures etc. The price shall also include reinstatement and of dismantled obstacles except for the trees. The Contractor shall submit a dilapidation video and get approval before removing any obstacle's.	L.S	1		
1.3	Project sign boards : - Main sign boards with size 2.0 x 1.5m, in accordance with the Engineer instructions. The boards shall be designed (foundation, galvanized steel board, galvanized steel poles etc.) by the Contractor and approved by the Engineer.	No.	2		
1.4	Facilities provided to the Engineer or Employer (including guarding, maintenance, supplies, etc. as per general specification)				
1.4.1	Site offices for the Engineer and Client (5 people) minimum area 90 m2 including maintenance, furniture, running costs, etc.	Month	12		
1.5	Allow for every expenses and works to move carefully all existing project Material (Pipes, valves, fittings, etc.) from Yata Municipality/PWA storage yard/warehouse in Yatta to the Contractor Storage Area/warehouse. The price shall include the loading and unloading, Storage area approved by the Engineer, Storage keepers, security, preparation of storage in/out system, inventory before and after the implementation of the project, cleaning, sand blasting, welding, epoxy coating, repair and refabricating of all materials to make suitable for the use in the project.	L.S	1		
1.6	Demobilization at completion of works, including clearance of all sites	L.S	1		
1.7	Testing & Commissioning of all project components.	L.S	1		
<b>TOTAL Preliminary Works: Mobilization and Demobilization</b>					

N°	TITLE	UNIT	QUANTITIES	UNIT PRICE (NIS)	Total AMOUNT (NIS)
Dayworks/ Provisional will be used only for items which are not already priced in the other schedules and which are not already described in the scope of works. A prior approval or instruction from the Supervision Engineer is a mandatory to implement these items.					
<b>2 Provisional Items/ Day Works</b>					
<b>2. A) Cleaning, Washing, Testing &amp; Disinfection of pipelines</b>					
A.1	Allow for every works and expenses to make Hydrostatic Pressure Testing for the water pipes which were implemented in 2019 project and as shown in the As built drawings. The price shall include all the needed equipment, experts, manpower, safety equipment, water needed and fittings etc. to seal, prepare and do the Hydrostatic Pressure Testing. The price shall also include work at night if needed. All in accordance with the specifications, the Engineer instruction and 2019 project documentation (as built drawing, etc.). Once the Hydrostatic Pressure test is successfully completed, the liability of the pipe is transferred under the Contractor responsibility.	L.M	65,000		
A.2	Allow for every works and expenses to make disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. All work shall be as per specifications, Drawings and the Engineer instructions.	L.M	65,000		
<b>2. B) Provisional Items/ Day Works - leak Detection and Steel pipe repair</b>					
B.1	Allow for every works and expenses to make Leak detection works/investigation for the water pipes which failed the pressure test from 2019 project. The price shall include all the needed equipment, experts, manpower, safety equipment, water needed and fittings etc. to discover and identify the leakage locations. The price shall also include work at night if needed. The price shall also include pressuring the pipes during the Leak detection. All in accordance with the specifications, the Engineer instruction and 2019 project documentation (as built drawing, etc.).	L.M	10,000		
B.2	Allow for every works and expenses to repair the leakage identified in the leak detection works. The price shall include excavation, bedding, backfilling, reinstatement, repair, welding, supply and install of all required fittings, pipes, short pieces similar and compatible with the installed pipes, insulation after repair, welding materials, equipment and manpower etc. The Contractor shall do all required works to repair the leakage in accordance with the specifications, the Engineer instruction and 2019 project documentation (as built drawing, etc.). After the repair is done, the liability of the repaired section will be under the Contractor responsibility.	No.	35		
B.3	Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for the repaired pipe sections before connecting with the existing pipes and all required necessary works according to GTS. All work shall be as per specifications, Drawings and the Engineer instructions.	L.M	10,000		
<b>2. C) Provisional Items/Day Works - Water Tightness and leakage/crack injection works</b>					
C.1	School Reservoir (If the results of water tightness Test No.1 is failed): leakage/ crack injection in wet or damp conditions for School Reservoir (1000m3). The price shall includes supply of all required materials, repair, injection in accordance with specifications, the supplier recommendations and the Engineer instructions	L.S	1		
C.2	<b>School Reservoir- Water Tightness Test No.2;</b> Carry out the leakage test for the reservoir by filling it completely with water for at least 24 hours as per specifications and to the approval of the Engineer and if the test failed he has to repair the leaks in tank at his own cost and re-test again to the satisfaction of the Engineer. The cost of water is to be included	L.S	1		
C.3	Khalet Salem Reservoir (If the results of water tightness Test No.1 is failed): leakage/ crack injection in wet or damp conditions for Khalet Salem Reservoir (5000m3). The price shall includes supply of all required materials, repair, injection in accordance with specifications, the supplier recommendations and the Engineer instructions	L.S	1		
C.4	<b>Khalet Salem- Water Tightness Test No.2;</b> Carry out the leakage test for the reservoir by filling it completely with water for at least 24 hours as per specifications and to the approval of the Engineer and if the test failed he has to repair the leaks in tank at his own cost and re-test again to the satisfaction of the Engineer. The cost of water is to be included	L.S	1		
<b>TOTAL Provisional Items/ Day Works</b>					

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<b>3. YATTA TRANSMISSION MAINS &amp; DISTRIBUTION NETWORKS- Supplementary Works</b>					
<b>3.1 Excavation Works</b>					
	<p>Unit prices of all items of earth works shall include the following:  Cleaning the site from all surplus back-fill material, results of excavation and dispose of excess material to locations acceptable to the Engineer and local authorities.  In case of double, triple or four trench pipe works, the excavation and backfilling shall be calculated for each diameter separately  Contractor must provide all safety measures at working sites according to PWA AND OSHA requirement  * In case of double or triple eff trenches, each line will be paid as single trench  * A. The pipe routs and locations of the pipes and valves are tentatives . The Engineers and Yatta Municipality will mark the final routs and locations during the walk thorough and the shop drawings which will be prepared by the Contractor.  The Contractor have no rights to claim or object.  B. The works and Price of the Contractor shall include the connection and disconnection of pipe with old and new network.  C. The As build provided to the Contractor might have some wrong information. The Contractor shall be fixable and will not have the rights to claim or object.  D. The Contractor shall keep the existing network functional during the works and shall programme his work according to Yatta Municipality instructions</p>				
	Excavate in all types of soil and rock according to the contract drawings and to the technical specifications stating by Clearing, grubbing of top soil , specified in the General Technical Specifications and up to the satisfaction of the Engineer. Excavation in asphalted areas must start by using asphalt cutting machine , compressors or hand excavating might be needed for the narrow roads or any needed place ,to reach the minimum depth and width required in the drawings . Dispose all excess material to locations acceptable to the Engineer and related authorities. All related works of this item and trench width should be implemented in accordance to General Technical Specifications and Drawings.				
3.1.1	Trench Excavation for Pipe Diameter 12 inch with excavation depth not less than 1350mm	L.M	450		
3.1.2	Trench Excavation for Pipe Diameter 10 inch with excavation depth not less than 1300mm	L.M	25		
3.1.3	Trench Excavation for Pipe Diameter 8 inch with excavation depth not less than 1250mm	L.M	350		
3.1.4	Trench Excavation for Pipe Diameter 6 inch with excavation depth not less than 1200mm	L.M	1300		
3.1.5	Trench Excavation for Pipe Diameter 4 inch with excavation depth not less than 950mm	L.M	850		
3.1.6	Trench Excavation for Pipe Diameter 3 inch with excavation depth not less than 930mm	L.M	650		
3.1.7	Trench Excavation for Pipe Diameter 2 inch with excavation depth not less than 900mm	L.M	990		
3.1.8	Trench Excavation for Pipe Diameter 1 inch with excavation depth not less than 900mm	L.M	320		
<b>3.2 Trench backfilling (Soft and Final Backfilling )</b>					
	Allow for every expenses and works to supply and backfill the excavated trench backfilling (Soft and Final Backfilling ). The works shall be done in two stages:				
	Soft Backfilling: supplying and backfilling (surrounding the pipe) By using sand (Single Size-Smsm) according to PS421 or equivalent . This material shall be placed 150 mm below the invert level up to 200 mm over the crown of the pipe and for the full width of the trench .The pipes should be supported on sacks filled with sand 150 mm height every 15m .The work shall be completed according to the drawings, general technical specifications and Engineer's approval.				
	Final backfilling :of the excavated trench by supplying and backfilling of the excavated trench depending on the type of the trench as shown on the Detailed drawings for different types of trenches. The Backfilling shall be in layers not exceeding 250 mm. The unit price shall include imported material as per technical specifications, compaction, and disposal of excavated material. Compaction tests and grain size analysis must be carried out each 150 m by the contractor and at his own expense according to AASHTO T191, T180 or equivalent. The price also include supply and install plastic blue warning tape marked "water pipe" one continuous layer over water pipe minimum thickness 0.1 mm. The unit price must cover concrete encasement for pipes crossing main roads, or sewers, or concrete over pipes, installed in very low depth caused by unseen obstacles and where needed and/ or requested by the supervising engineer and using warning tapes.				
3.2.1	Trench backfilling for Pipe Diameter 12 inch	L.M	450		
3.2.2	Trench backfilling for Pipe Diameter 10 inch	L.M	25		
3.2.3	Trench backfilling for Pipe Diameter 8 inch	L.M	350		
3.2.4	Trench backfilling for Pipe Diameter 6 inch	L.M	1300		
3.2.5	Trench backfilling for Pipe Diameter 4 inch	L.M	850		
3.2.6	Trench backfilling for Pipe Diameter 3 inch	L.M	650		
3.2.7	Trench backfilling for Pipe Diameter 2 inch	L.M	990		
3.2.8	Trench backfilling for Pipe Diameter 1 inch	L.M	320		
<b>3.3 Install of Steel Pipe Works</b>					

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	GENERAL Notes: Installation of pipes and associated fittings. Costs will include connections to the Existing main and distribution pipes, where needed. The Unit price shall include all the related works .All shall be done in accordance with Specification, drawings and instructions of the engineer.				
	Installation of Steel Pipes and Fittings				
	Installation of 12 Inch Steel Pipe and accessories. The price shall include spreading pipes along the route of pipelines, welding the steel pipe (to be done only by a certified welder), welded joints must be wrapped by using heat shrinkable sheet where needed or according to the instructions of the Engineer. Price shall also include welding /fixing of readymade elbows, tees acts... all according to the instructions of the supervisor. and to locate them on site. The damaged outside ( must be cleaned and repaired according to the manufacture recommendations and Engineer's instructions . Rate should also includes connection of the new pipe lines with the existing pipelines, installation of all types of fittings accessories (tees, elbows, adaptors, saddles, etc...) pipe laying, commissioning installation of all types of fittings (tees, elbows, adaptors, etc...), pipe laying all as per drawings and PWA specifications, GTS,engineer's approval, and contract conditions. Price shall also include supply of all needed materislis such as heat shrinkable sheet, wealding rods etc. Price shall also include repair and maitenance and epoxy coating of the elbows, tees, reducers etc needed for the works.	L.M	450		
	Unit prices shall also include execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. All work shall be as per specifications, Drawings and the Engineer instructions.				
3.3.1	Ditto but for Installation of 10 Inch steel pipes and fittings	L.M	25		
3.3.2	Ditto but for Installation of 8 Inch steel pipes and fittings.	L.M	350		
3.3.3	Ditto but for Installation of 6 Inch steel pipes and fittings.	L.M	1300		
3.3.4	Ditto but for Installation of 4 Inch steel pipes and fittings.	L.M	850		
3.3.5	Ditto but for Installation of 3 Inch steel pipes and fittings.	L.M	650		
<b>3.4 Install of Galvanized steel pipes works</b>					
	GENERAL Notes : Unit prices of item shall include the following: 1-Install of all required fittings(elbows, tees, couplings, nipples ,etc.). 2- Costs will include connections to the Existing main and distribution pipes, where needed. The Unit price shall include all the related works .All shall be done in accordance with Specification, drawings and instructions of the engineer. 3- Cost includes execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS.				
3.4.1	Installation of 2 Inch Galvanized Threaded steel pipes complete including but not limited to: spreading pipes, laying of pipes, installation of all required fittings(elbows, tees, couplings, nipples ,etc.) and all required works to complete installation of pipeline .rate should also includes connections of the new pipe lines with the existing pipe lines in the network, installation must be by using the couplings and lowering inside the ditches 50mm nominal diameter threaded galvanized steel pipe lines, including of the fittings needed ( threaded elbows, records, nipples, couplings, plugs, unions, bends..etc.)..and heated shrinkable tapes, cutting ,shaping, connecting existing network, making new threads and installing of elbows as needed so as the line will be always in the center line of the trench including wrapping the joints and the damaged outside wrapping. Work shall be completed according to the contract conditions, General technical specifications and the Engineer's approval. Price shall also include supply of all needed materislis such as heat shrinkable tapes, threaded elbows, records, nipples, couplings, plugs, unions, bends..etc Price shall also include repair and maitenance and epoxy coating of the elbows, tees, reducers etc needed for the works.	L.M	1000		
	Unit prices shall also include execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. All work shall be as per specifications, Drawings and the Engineer instructions.				
3.4.2	Ditto but for Installation of 1 Inch steel pipes and fittings.		320		
<b>3.5 Reinstatment Works</b>					
	Restore (as before excavation) similar to existing conditions (asphalt, base corse, concrete etc.) as before excavation for roads and off-roads water pipe lines routes and house connection , including removal of soil layers, and moving the excavated material either to approved location or to waste, all according to specifications and as directed by the Supervisor. The reinstatement shall be done in accordance with the specifications and the Engineer instructions. Asphalt pavement shall be compacted to 98% according to AASHTO T 166 or AASHTO T230 or equivalent. Spraying 2 kg of prime coat (MCO) per each square meter over the compacted base course, and applying a layer of asphalt mix of size ¾" , in a thickness not less than 60mm, after compaction which should satisfy the specification of Palestinian Ministry of Public Works.	L.M	4935		
<b>3.6 Valves, Connections and Chambers Works</b>					

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	General Notes for Valves, Connections and Chambers Works: * The prices shall include cleaning the manholes from inside from all dirt and water. * The prices shall include manhole cover repair and adjustment. * Prices shall include epoxy coating of the pipes and valves inside if needed.				
3.6.1 Isolation Valve					
3.6.1.1	Supply and install Reinforced Concrete for a complete chamber for DN 300mm,200mm,50mm mm Flanged Gate Valve as per Drawing No. YWSP-EW-PC-36. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, ventilation, drainage pit, ladder/steps,concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only Gate Valve, Dismantling Joint, Manhole Cover, bolts are to be provided by the project existing materials.	No.	7		
3.6.1.2	Supply and install Reinforced Concrete for a complete chamber for DN 50 mm Flanged Gate Valve as per Drawing No. YWSP-EW-PC-02. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, ventilation, drainage pit, ladder/steps,concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only Gate Valve, Dismantling Joint, Manhole Cover, bolts are to be provided by the project existing materials.	No.	45		
3.6.1.3	Supply and install Reinforced Concrete for a complete chamber for DN 80 mm Flanged Gate Valve as per Drawing No. YWSP-EW-PC-04. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, ventilation, drainage pit, ladder/steps,concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only Gate Valve, Dismantling Joint, Manhole Cover, bolts are to be provided by the project existing materials.		12		
3.6.1.4	Supply and install Reinforced Concrete for a complete chamber for DN 100 mm Flanged Gate Valve as per Drawing No. YWSP-EW-PC-06. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, ventilation, drainage pit, ladder/steps,concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only Gate Valve, Dismantling Joint, Manhole Cover, bolts are to be provided by the project existing materials.	No.	27		
3.6.1.5	Supply and install Reinforced Concrete for a complete chamber for DN 150 mm Flanged Gate Valve as per Drawing No. YWSP-EW-PC-08. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, ventilation, drainage pit, ladder/steps,supports,concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only Gate Valve, Dismantling Joint, Manhole Cover, bolts are to be provided by the project existing materials.	No.	13		



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3.6.1.6	Supply and install Reinforced Concrete for a complete chamber for DN 200 mm Flanged Gate Valve as per Drawing No. YWSP-EW-PC-09. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, ventilation, drainage pit, ladder/steps, supports, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only Gate Valve, Dismantling Joint, Manhole Cover, bolts are to be provided by the project existing materials.	No.	1		
3.6.1.7	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN 300, 300.200 & 50mm Valves as per with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-02. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel, elbows by pass, ventilation, supports, Relief valve Vent, drainage pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existing materials.	No.	1		
3.6.1.8	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN 300, 200 & 50mm Valves as per with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-06. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel, supports, elbows by pass, ventilation, Relief valve Vent, drainage pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existing materials.	No.	1		
3.6.1.9	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN 200, 150 & 50mm Valves as per with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-09. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel, supports, elbows by pass, ventilation, Relief valve Vent, drainage pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existing materials.	No.	1		
3.6.1.10	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN 50mm Valves as per with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-63. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel, supports, elbows by pass, ventilation, Relief valve Vent, drainage pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existing materials.	No.	3		
3.6.1.11	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN 80mm Valves as per with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-66. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel, supports, elbows by pass, ventilation, Relief valve Vent, drainage pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existing materials.	No.	3		
3.6.1.12	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN 100mm Valves as per with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-69. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel, supports, elbows by pass, ventilation, Relief valve Vent, drainage pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existing materials.	No.	6		

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3.6.1.1 3	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN 150mm Valves as per with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-72. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel, supports, elbows by pass, ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existng materials.	No.	1		
3.6.2 Combination Air Valve Chambers					
3.6.2.1	Supply and Install Complete Reinforced Concrete chamber for DN 50 mm Combination Air Valve (combination of air and vacuum valve and air release valve) pipelines as per Drawing No. YWSP-EW-PC-11. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, ventilation, drainge pit, ladder/steps, supports, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only combination of air and vacuum valve and air release valve, Dismantling Joint, Manhole Cover, bolts are to be provided by the project existng materials.	No.	6		
3.6.2.2	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN75,75,75mm Combination Air Valve (combination of air and vacuum valve and air release valve) on DN300,250,200mm pipe with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-12. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel, supports, elbows by pass, ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existng materials.	No.	1		
3.6.2.3	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN75,75,75,50mm Combination Air Valve (combination of air and vacuum valve and air release valve) on DN300,300,200,50mm pipe with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-15. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel, supports, elbows by pass, ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existng materials.	No.	1		
3.6.2.4	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN75,75,50mm Combination Air Valve (combination of air and vacuum valve and air release valve) on DN300,200,50mm pipe with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-20. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel, supports, elbows by pass, ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existng materials.	No.	3		
3.6.2.5	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN50mm Combination Air Valve (combination of air and vacuum valve and air release valve) with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-20. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel, supports, elbows by pass, ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existng materials.	No.	14		

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3.6.2.6	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN75mm Combination Air Valve (combination of air and vacuum valve and air release valve) with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-20. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel,supports, elbows by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existng materials.	No.	1		
3.6.2.7	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN 50,50mm Combination Air Valve (combination of air and vacuum valve and air release valve) with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-28. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel,supports, elbows by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existng materials.	No.	3		
3.6.2.8	Supply and Install Complete Reinforced Concrete chamber for DN 75, 75,50 mm Combination Air Valve (combination of air and vacuum valve and air release valve)pipelines as per Drawing No. YWSP-EW-PC-38. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, ventilation, drainge pit, ladder/steps,supports,concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only combination of air and	No.	5		
3.6.3 Washout Chamber					
3.6.3.1	Supply and Install Complete Reinforced Concrete chamber on different pipe diameter a DN 50 mm Washout as per Drawing No. YWSP-EW-PC-13. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, ventilation, drainge pit, supports,ladder/steps, washout outfall in urban areas, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only Gate Valve, Dismantling Joint, Manhole Cover, bolts are to be provided by the project existng materials.	No.	12		
3.6.3.2	Supply and Install Complete Reinforced Concrete chamber on different pipe diameter a DN 75 mm Washout as per Drawing No. YWSP-EW-PC-15. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, ventilation, drainge pit, ladder/steps, supports, washout outfall in urban areas, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside	No.	4		
3.6.3.3	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN75,50mm Washout with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-31. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel,supports, elbows by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, supports, washout outfall in urban areas, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existng materials.	No.	1		
3.6.3.4	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN100, 75,50mm Washout with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-35. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel,supports, elbows by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, supports, washout outfall in urban areas, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existng materials.	No.	2		

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3.6.3.5	Supply and Install Complete Reinforced Concrete chamber on different pipe diameter a DN 100, 75,50mm Washout as per Drawing No. YWSP-EW-PC-35. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, ventilation, drainge pit, ladder/steps, supports, washout outfall in urban areas, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only Gate Valve, Dismantling Joint, Manhole Cover, bolts are to be provided by the project existitng materials.	No.	4		
3.6.3.6	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN100,100, 75,50mm Washout with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-38. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel,supports, elbows by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, supports, washout outfall in urban areas, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existitng materials.	No.	1		
3.6.3.7	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for DN100,100, 75 mm Washout with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-41. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel,supports, elbows by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, supports, washout outfall in urban areas, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existitng materials.	No.	1		
3.6.3.8	Supply and install all mechanical valves, fittings, electrical equipments and wiring, for DN75, 75 mm Washout with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-44. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel,supports, elbows by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, supports, washout outfall in urban areas, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, Manhole Cover, bolts are to be provided by the project existitng materials.	No.	2		
3.6.4 Pressure Reducing Valve					
3.6.4.1	Supply and Install Complete Reinforced Concrete chamber on different pipe diameter a DN 80 mm Pressure Reducing Valve and all mechanical fittings as per Drawing No. YWSP-EW-PC-17. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only the valves, Manhole Cover, bolts are to be provided by the project existitng materials.	No.	3		
3.6.4.2	Supply and Install Complete Reinforced Concrete chamber on DN 300 mm Pressure Reducing Valve (150) and all mechanical fittings as per Drawing No. YWSP-EW-PC-19. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes, by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings.	No.	2		
3.6.5 Service Connection Chambers					

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3.6.5.1	Supply and Install Complete Reinforced Concrete Flow Monitoring Chamber Zif I service connection on DN 500mm pipe as per Drawing No. YWSP-EW-PC-22. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel,, elbows by pass, ventilation, Relief valve Vent, supports, drainage pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only the valves, electromagnetic flow meter, Manhole Cover, bolts are to be provided by the project existing materials. Price shall also include supply and installation of pressure transmitter with all its wiring and accessories.	No.	1		
3.6.5.2	Supply and Install Complete Reinforced Concrete Flow Monitoring Chamber Zif 2 service connection on DN 500mm, 300mm, 250mm, 200mm pipes as per Drawing No. YWSP-EW-PC-23. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions from Ductile iron to steel, supports, elbows, by pass, ventilation, Relief valve Vent, drainage pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only the valves, electromagnetic flow meter, Manhole Cover, bolts are to be provided by the project existing materials. Price shall also include supply and installation of pressure transmitter with all its wiring and accessories.	No.	1		
3.6.5.3	Supply and Install Complete Reinforced Concrete Flow Monitoring Chamber Al-rihiya II service connection on DN 150mm pipe as per Drawing No. YWSP-EW-PC-26. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel,, elbows by pass, ventilation, supports, Relief valve Vent, drainage pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only the valves, electromagnetic flow meter, Manhole Cover, bolts are to be provided by the project existing materials. Price shall also include supply and installation of pressure transmitter with all its wiring and accessories.	No.	1		
3.6.5.4	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for the Beit Amra service connection (150mm) with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-47. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers, transitions Ductile iron to steel,, elbows by pass, ventilation, supports, Relief valve Vent, drainage pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechanical and electrical components as specified in the contract drawings, GTS and Engineer approval. Only the valves, electromagnetic flow meter, Manhole Cover, bolts are to be provided by the project existing materials. Price shall also include supply and installation of pressure transmitter with all its wiring and accessories.	No.	1		
3.6.5.5	ditto but for Samou service connection on DN 250mm pipe Drawing YWSP-EW-CH-50	No.	1		
3.6.5.6	ditto but for Al rihiya I connection on DN 300mm pipe Drawing YWSP-EW-CH-53	No.	1		
3.6.5.7	Testing and Commissioning of Electrical and Control System and Equipment complete for all the Service Connection Chambers according to design drawings and specifications	L.S	1		
3.6.5.8	Scada head end integration and programming	L.S	1		
3.7 CONNECTION CHAMBER					

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3.7.1	Supply and Install Complete Reinforced Concrete Flow Monitoring Chamber Al-Arous and hureiz reservoirs connection "A" service connection on DN 300mm pipe as per Drawing No. YWSP-EW-PC-30. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel, elbows by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, supports,concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only the valves, Manhole Cover, bolts are to be provided by the project exisiting materials.	No.	1		
3.7.2	Supply and Install Complete Reinforced Concrete Flow Monitoring Chamber Al-Arous and hureiz reservoirs connection "B" service connection on DN 500mm pipe as per Drawing No. YWSP-EW-PC-31. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, supports,steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel, supports, elbows by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only the valves, Manhole Cover, bolts are to be provided by the project exisiting materials. Price shall also include supply and installation of pressure transmitter with all its wiring and accessories.	No.	1		
3.7.3	Supply and Install Complete Reinforced Concrete Flow Monitoring Chamber School reservoirs connection "A" service connection on DN 500mm pipe as per Drawing No. YWSP-EW-PC-33. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel, elbows by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only the valves, Manhole Cover, bolts are to be provided by the project exisiting materials. Price shall also include supply and installation of pressure transmitter with all its wiring and accessories.	No.	1		
3.7.4	Supply and Install Complete Reinforced Concrete Flow Monitoring Chamber School reservoirs connection "B" service connection on DN 300mm pipe as per Drawing No. YWSP-EW-PC-33. Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-350 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, supply and install of rings, steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel, elbows by pass,ventilation, Relief valve Vent, drainge pit, ladder/steps, concrete paving, supports,backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation and construct the Reinforced Concrete with all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Price includes Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve and fittings. Only the valves, Manhole Cover, bolts are to be provided by the project exisiting materials.	No.	1		
3.7.5	Supply and Install all Mechanical valves, fittings, electrical equipments and wiring, for the mtaref reservior connection (300mm, 250mm) with all fittings needed outside the chambers for the connection as per Drawing YWSP-EW-CH-56. Price shall also include supply and install of rings, steel pipes (inside and outside), tees, reducers,transitions Ductile iron to steel,, elbows by pass,ventilation, supports,Relief valve Vent, drainge pit, ladder/steps, concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to supply, installation all its mechnical and electrical componants as specified in the contract drawings, GTS and Engineer approval. Only the valves, electromagnatic flow meter, Manhole Cover, bolts are to be provided by the project exisiting materials. Price shall also include supply and installation of pressure transmitter with all its wiring and accessories.	No.	1		
3.7.6	ditto but for khalet saleem reservior connection (DN 300mm,250mm) Drawing YWSP-EW-CH-59.	No.	1		
<b>TOTAL YATTA TRANSMISSION MAINS &amp; DISTRIBUTION NETWORKS- Supplementary Works</b>					



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			Firm	Firm	Firm Total	Conditional	Firm Conditional
<b>4 Pavement repair and reinstatement</b>							
	<b>Notes:</b> <b>* A. The final locations of the reinstatement/asphalt works/routes and locations are tentatives . The Engineers and Yatta Municipality will mark the final routs and locations during the walk thorough and the shop drawings which will be prepared by the Contractor. The Contractor have no rights to claim or object. The Contractor shall prices his items based on this information.</b> <b>B. The Contractor shall prepre all required shopdrawings, designs and survey after defining the loactions with Yatta Munciapilty.</b> <b>C. The prices shall include all required prereparations needed before the asphalt works</b> <b>D. Price shall include but, is not limited to; existing frame and manhole cover adjustment to match the new P.G.L where applicable, adjustment of private houses entrances etc.).</b>						
4.1	Pavement repair and reinstatement						
4.1.1	Supplying, spreading and compacting and testing for Asphalt reinstatement over trench pipe trench or several pipe trenches , including 200mm base course layer, 6cm Asphalt layer after compaction, cm,¾" asphalt mix design prime coat (MC70), tack coat (RC) all according to specification and Engineer instruction. Works shall be implemented in different locations and trench widths. Price includes preperation of the under aspult layer (bascourse, etc). The unit price shall include excavating, grading, preperation of subgrade layer(compaction), backfilling, leveling, compacting and cleaning the site and removing the surplus material to a site approved by the Engineer. Price includes Liquid Asphalt Prime Coat (Gird. MC. 70) 2 Kg. per square meter., mixed with the thinner on dry, smooth and clean surface. Asphalt shall be compacted to a minimum of 98% density in accordance with AASHTO F.D.T. (T-166) or T-230.	sqm	15000			10000	
4.1.2	Milling and Overlay 6cm Asphalt layer after compaction for single or double lane width with tack coat (RC) all according to specification and Engineer instruction. Works shall be implemented in different locations and trench widths. Price includes Liquid Asphalt Prime Coat (Gird. MC. 70)/ RC 2 Kg. per square meter., mixed with the thinner on dry, smooth and clean surface. Asphalt shall be compacted to a minimum of 98% density in accordance with AASHTO F.D.T. (T-166) or T-230.	sqm	22,500			50,000	
4.1.3	Supplying, spreading and compacting and testing for Asphalt works in narrow roads up to 6.0 m width including 200 mm base course layer, asphalt wearing course layer (6 cm), prime coat (MC70) for the whole width of the road and removal of the asphalted area and reconstruction to match original asphalt level. all according to specification and Engineer instruction. Works shall be implemented in different locations and trench widths. Basecourse incldues Supplying, spreading and compacting one layer of base coarse materials (grade A) with 20cm thickness each layer to reach 100% of the maximum density with optimum moisture and compaction in accordance with the modified AASHTO F.D.T. (T-80), T-191 or equivalent standard. The unit price shall include excavating, grading, preperation of subgrade layer(compaction), backfilling, leveling, compacting and cleaning the site and removing the surplus material to a site approved by the Engineer. Price includes Liquid Asphalt Prime Coat (Gird. MC. 70) 2 Kg. per square meter., mixed with the thinner on dry, smooth and clean surface. Asphalt shall be compacted to a minimum of 98% density in accordance with AASHTO F.D.T. (T-166) or T-230.	sqm	0			45000	
<b>TOTAL Pavement Repair and Reinstatement Works</b>							

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<b>5 Complementary Works: Beit Ammra 500m3 Elevated Tank</b>					
<b>5.1</b>	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
5.1.1	Miscellaneous: Remove and clean Beit Ammra elevated tank and access road from all dirt's, obstacles etc. This shall include the Elevated tank itself, the yard, any element within the site boundary, access road etc. The price shall also include the water which will be used for cleaning and transporting the collected dirt's, obstacles etc. to an approved location. The cleaning shall be done before starting any type of works and before the handing over of the project.	L.S	1		
<b>5.2</b>	<b>GENERAL - Civil Site Preparation</b>				
5.2.1	Supplying, spreading and compacting one layer of base coarse materials (grade A) for the area surrounding the reservoir, with 20cm thickness each layer to reach 100% of the maximum density with optimum moisture and compaction in accordance with the modified AASHTO F.D.T. (T-80), T-191 or equivalent standard. The unit price shall include excavating, grading, preparation of subgrade layer(compaction of Structural backfill for subgrade layer (excavated selected materials or imported approved materials)), backfilling, leveling, compacting and cleaning the site and removing the surplus material to a site approved by the Engineer. For the Yard below the Asphalt. The price shall include any excavation or leveling required to reach the required levels.	sq m	290		
5.2.2	Asphalt pavement on site (6 cm), ¾" asphalt mix design. Price includes Liquid Asphalt Prime Coat (Gird. MC. 70) 2 Kg. per square meter., mixed with the thinner on dry, smooth and clean surface. Asphalt shall be compacted to a minimum of 98% density in accordance with AASHTO F.D.T. (T-166) or T-230.	sq m	290		
5.2.3	Supply and installation of Curb stone size 17 * 25 * 100 cm, including excavations and B300 concrete under the front stone with dimensions of (40 * 10) cm2 and reinforcement concrete behind the stones with dimensions of (15 * 15) cm (provided that it is not peppered) and a layer of Biscours with a thickness of 10 cm under the concrete, lining and painting on two layers or as needed and all that is needed according to the specifications, plans and instructions of the supervising engineer.	l.m	35		
<b>5.3</b>	<b>Mechanical Works</b>				
	Note: Price to include the supply and all required works to install the equipment properly as specified, shown on the drawings and directed by the engineer. The following should be considered: * Interior surfaces of all steel pipe fittings shall be lined with cement mortar lining. * External surfaces of all steel pipes, fittings shall be epoxy lined and painted at the factory according to AWWA C210. * All pipe diameters are inside diameter. * The flushing, washing, cleaning, disinfection and hydrostatic pressure testing shall be done before the connecting with existing Pipelines * Connecting the new water pipelines with the existing shall not be done unless Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning have been done and approved by engineer * The project materials to be provided to the Contractor are only the valves and electromagnetic flow meter.				
5.3.1	Inlet/Outlet Pipe (Exposed Work ) Allow for each and every expense to supply and install and complete a 6 inch steel pipes, Sch40 welded and with internal colloidal concrete lining (6.0 mm) thickness according to P.S NO.325 PART 1 and External surfaces of all steel pipes, fittings shall be epoxy lined and painted at the factory according to AWWA C210 for pipes above ground. The price shall include supplying and installing all the required black steel fittings and accessories (pipe supports, elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, puddle flanged pipe, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the fixing and supporting the pipes with reservoir structure and support the inlet pipe with Concrete support. Unit prices shall also include execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. All work shall be as per specifications, Drawings and the Engineer instructions.	L.M	18		
5.3.2	Washout/ Overflow Pipe (Exposed Work ) Allow for each and every expense to supply and install a 6 Inch steel pipes, 5/32 " wall thickness steel pipes according to P.S NO.186 grade B, welded and with internal colloidal concrete lining (6.0 mm) thickness according to P.S NO.325 PART 1 and External surfaces of all steel pipes, fittings shall be epoxy lined and painted at the factory according to AWWA C210 for pipes above ground. All pipes and fittings under ground shall be PE coated with PN 16 fittings and accessories. The price shall include supplying and installing all the required black steel fittings and accessories (pipe supports, elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, puddle flanged pipe, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the fixing and supporting the pipes with reservoir structure. Unit prices shall include also flushing, washing, cleaning, disinfection and hydrostatic pressure test and all required necessary works according to GTS. All work shall be as per specifications, Drawings and Supervisor Engineer.	L.M	22		



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<b>5 Complementary Works: Beit Ammra 500m3 Elevated Tank</b>					
5.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
5.3.3	<p>Inlet/Outlet Pipe (under ground)</p> <p>Allow for each and every expense to supply and install a 6 Inch steel pipes, Sch40, welded and with internal colloidal concrete lining (6.0 mm) thickness according to P.S NO.325 PART 1 and external polyethylene external coating with minimum thickness of 1.8 mm according to P.S NO.325 PART 6 wrapping applied by the extrusion method with all required appurtenances with all fittings and accessories. The price shall include supplying and installing all the required black steel fittings and accessories (elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, plastic warning tape, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the Trench Excavation in all types of soil and rock to install one pipeline or more than one pipeline of potable water of different pipe diameters. Excavation shall cover clearing, grubbing of top soil , trimming bottoms and sides of trench to the depths and widths shown on drawings, removal and disposal of all excess material to locations acceptable to the Engineer. Price shall also include supplying and backfilling (surrounding the pipe) by using sand of PS421 or equivalent. Price shall also include supplying backfilling of the excavated trench depending on the type of the trench as shown on the Detailed drawings for different types of trenches. The Backfilling shall be in layers not exceeding 250 mm measured before compaction. The unit price shall include imported material as per technical specifications, compaction, and disposal of excavated material. Compaction tests and grain size analysis must be carried out each 150 m by the contractor and at his own expense. Unit prices shall include also Hydrostatic Pressure Testing, disinfection, flushing and all required necessary works according to GTS. All work shall be as per specifications, Drawings and Supervisor Engineer.</p>	L.M	45		
5.3.4	<p>Washout/ Overflow Pipe (under ground)</p> <p>Allow for each and every expense to supply and install a 6 inch steel pipes, 5/32 " wall thickness steel pipes according to P.S NO.186 grade B, welded and with internal colloidal concrete lining (6.0 mm) thickness according to P.S NO.325 PART 1 and external polyethylene external coating with minimum thickness of 1.8 mm according to P.S NO.325 PART 6 wrapping applied by the extrusion method with all required appurtenances with PN 16 fittings and accessories. The price shall include supplying and installing all the required black steel fittings and accessories (elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, plastic warning tape, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the Trench Excavation in all types of soil and rock to install one pipeline or more than one pipeline of potable water of different pipe diameters. Excavation shall cover clearing, grubbing of top soil , trimming bottoms and sides of trench to the depths and widths shown on drawings, removal and disposal of all excess material to locations acceptable to the Engineer. Price shall also include supplying and backfilling (surrounding the pipe) by using sand of PS421 or equivalent. Price shall also include supplying backfilling of the excavated trench depending on the type of the trench as shown on the Detailed drawings for different types of trenches. The Backfilling shall be in layers not exceeding 250 mm measured before compaction. The unit price shall include imported material as per technical specifications, compaction, and disposal of excavated material. Compaction tests and grain size analysis must be carried out each 150 m by the contractor and at his own expense. Unit prices shall include also Hydrostatic Pressure Testing, disinfection, flushing and all required necessary works according to GTS. All work shall be as per specifications, Drawings and Supervisor Engineer.</p>	L.M	36		
5.3.5	<p>Inlet/Outlet Connection with existing Pipes</p> <p>Allow for each and every expense to supply and install all required steel pipes and fittings from the same type of Steel Pipe (Tees, reducers, elbows, flanges, etc.) to connect with existing inlet and Outlet pipes. The price shall include all required works to connect proposed inlet pipe to existing transmission pipeline and connecting outlet with existing network. The price shall also include connecting and disconnecting with all required works such civil works (excavations, backfilling, reinstatement etc.), welding, cleaning, testing, etc.</p>	L.S	1		
5.3.6	Supply and install 6 inch Stainless steel 316L for overflow and inlet pipes Price shall include all required Stainless steel 316L fittings, accessories, flanges, bolts, supports, hangers et	L.M	12		
5.3.7	Supply and install Stainless steel 316L for overflow, washout and outlet Bell Mouth (8 inch to 6 Inch). Price shall include all required Stainless steel 316L fittings, accessories, flanges, bolts, supports, hangers etc.	No.	3		
5.3.8	Supply and install and commission Hose Bibb and Rack system with al required pipes, valves, accessories and fittings etc. Project materials will only provide the Hose Bibb and Rack and valves.	L.S	1		

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<b>5 Complementary Works: Beit Ammra 500m3 Elevated Tank</b>					
5.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
5.3.9	Furnish and install all reservoir mechanical equipment including all valves, hangers, fittings, float controls, magnetic flow meter and equipment to provide a complete and functional elevated reservoir and piping system within the site boundaries. The price shall also include all associated work outside of the site boundary. Pricing shall include all necessary excavation, backfilling, cleaning, testing, disinfection, commissioning and operations instruction and training for the mechanical systems. Price shall include supply and installation of all required accessories, elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, etc.). All shall be done in accordance with drawings and engineer instruction. Only the valves will provided by Project available materials	L.S	1		
5.3.10	Supply, paints, fixing and anchoring of the water level Indicator. The water level indicator consists of fix level gauge with 3 stage indicators and removable gauge. Pipes and all other part of the indicator inside the water tank to be painted by epoxy (non-toxic) coating with 100% solids (Solvent free) with 2 coat of 200-micron thickness per coat All in accordance with GTS, drawings and Engineers approval. Note: All pipe and parts inside the water tank shall be stainless steel (type 316). To be placed on concrete support.	L.S	1		
5.3.11	Supply and install a 4 to 20mA submersible hydrostatic water level sensor in tank, from 0 to 5m H2o, jacket is made from stainless steel, equipped with factory made flexible cable, to be connected to PLC/ RTU. Price shall include all required materials, wiring, works to fix properly and as instructed by the Engineer. The Contractor shall submit the deisgn of fixation.	No.	1		
5.4	<b>Electrical Works</b>				
5.4.1	Installation Light pole: Installation of 6100mm galvanized (in accordance with ASTM A123M) pole octagonal reinforced shaft on a 15 base plate complete with 50 tubular lighting arm 1500 long and Lamp 70W H.P.S. The price include supply and installation all fittings (cable, pipes, bolts...etc.) to have a complete working job. The Contractor shall submit the required wiring diagram and designs.	No.	2		
5.4.2	Furnish and installation of panels, wires, conduits, cables, lights and receptacles. The Contractor shall submit the required wiring diagram and designs.	L.S	1		
5.4.3	Supply, install, connect and test electronic lightning arrester system including (120mm2) bare copper wires, conduits, clamps, trunks, manholes, drilling, fixing plots, washers, nuts, electrodes and all needed material and works to compete the system with all accessories according to drawings, specifications and Engineer's approval. Work also include but not limited to: • Supply and install of 50m Minimum radius electronic lightning arrester system. • Supply and install of 3 lightning pits 40x40 cm (for Lightning) with 19 mm diameter copper electrode, 1.5 m length, and heavy duty cast iron cover 25T, including excavation, backfilling, backfill material, and all needed works according to the drawings, specifications and Engineer's instructions for pit & trench. • Supply and install of 1x120mm2 lightning bare cable (protected in 32 mm diameter rigid PVC Pipe to be connected between lightning pits and lightning arrester). • Work also include supply and install 32 mm diameter rigid PVC Pipe to be connected between lightning pits and lightning arrester for the protection of the 120 mm2 lightning bare cable. Note: calculations of lightning protection coverage radius must be submitted when selecting lightning pulsar terminal to insure full coverage of the building	L.S	1		
5.4.4	Supply, install, connect and test water level switch- indicator. Price shall include all stainless steel clamps, stainless steel body and screw, stainless steel 1.5 inch pipe, control cable connection, control cable, , junction box etc. All as drawings, specifications and Engineer instructions.	No.	1		
5.4.5	Install Beacon light complete. The price includes supply all materials. light, fixing, fixing materials, all cables (3X2.5 mm2 XLPE - insulated) and protected inside PVC pipe ,conduits ,switches and fuses needed to switching on the lamp as per specification ,drawing and supervision engineer. Only the Beacon light will be provided.	L.S	1		
5.4.6	Supply and Install of light fixture including all required electrical components and cables (3X2.5 mm2 XLPE - insulated) and protected inside 32mm PVC pipe and all necessary items to complete the work as shown on the drawings and as instructed by the engineer	No.	5		
5.4.7	supply, install, connect, testing and commission of the existing distribution boards, complete with (mcb) circuit breakers (10KA), isolators, earth leakage C.B, distribution terminal blocks according to local electrical authority and according to drawings, specifications and relevant codes.				
A	KWHMB (excluding KWH meter only)	No.	1		
B	DB- Tank	No.	1		

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<b>5 Complementary Works: Beit Ammra 500m3 Elevated Tank</b>					
5.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
5.4.8	<p>Earthing System</p> <p>Supply, install, connect, test and commission a complete earthing system for the project including all conductors, termination to Main earth box, copper rods, cables, clamps, conduits, hand holds with heavy-duty cast-iron cover 25T, unit price also including excavation not less than (40H x 40W) cm and backfilling, backfill material, sand, warning tape, and all other needed materials, according to drawings, specification, local authority regulations, and Engineer approval and related codes as shown in Drawings. Work also include but not limited to:</p> <ul style="list-style-type: none"> <li>• Supply and install of one complete main earth box (40x40) cm oven painted metal box.</li> <li>• complete if needed 30x3 mm galvanized steel strip welded and to be connected to earth box and all earthing manholes with 1x10 mm2 insulated copper earth cable.</li> <li>• Supply and install of 4 readymade manholes (Earth pits 40x40 cm with 19 mm diameter copper electrode, 1.5m length and where are needed (for Earthing) with manhole cover 25 ton, including excavation, backfilling, backfill material, and all needed works for pit and trench according to the drawings, specifications and Engineer's instructions.</li> <li>• Supply and install of 10 mm2 insulated earthing cable and protected (inside 32 mm diameter PVC pipe) to be connected to all metal parts at the top of tank which is water pipes, hand rail, steel ladder, main earth box in MOB, distribution boards bodies .... etc.</li> <li>• Work also include supply and install of 32mm PVC pipe needed for the protection of the 10 mm2 insulated earthing cable.</li> </ul>	L.S	1		
5.4.9	Supply, install, test and commission 600 volts cables with all required accessories for proper installation, connection and operation, from KWHMB to electrical manhole at the main gate to reach the pole top (electricity source-selected in coordination with the service provider) as shown on drawing, as specifications and supervision engineer's requirements. The price includes all necessary work such as put not limit the following: excavation, backfilling, cutting, fixing, cables, conduits, pipes, testing, manholes. fees ... etc.				
	3x10 mm2 insulated cable For DB-Ground Floor	L.M	30		
5.4.10	<b>Manhole</b>				
	Supply, install, test and commission the following electrical, ready made reinforced concrete manhole including excavation and backfill material and all other needed materials according to drawing specifications and Engineer instructions. Manhole Dimension 60*40 cm ready made, with 25T heavy duty cast iron	No.	1		
5.4.11	<b>Builders works for Trenches</b>				
A	Supply, install, test, and commission the following builders work including excavation Not less than (60Hx40W) cm, backfilling, backfill material, sand, warning tape, and all other needed materials according to drawing specifications and Engineer instructions.	L.M	60		
B	Supply and install of 2*3" PVC Pipe	L.M	60		
5.4.12	Furnish, connect, tests and installation of RTU, RTU Panel and breaker Panel, electrical conduit and wire complete for RTU	L.S	1		
5.5	<b>Water Tests and repair</b>				
	<b>All tests shall be carried out and accepted prior to connecting to the existing. Those tests should be carried out in according with the specifications (GTS) and to the approval of the engineer.</b>				
5.5.1	<b>Water Tightness Test No.1;</b> Carry out the leakage test for the reservoir by filling it completely with water for at least 24 hours as per specifications and to the approval of the Engineer and if the test failed he has to repair the leaks in tank at his own cost and re-test again to the satisfaction of the Engineer. The cost of water is to be included.	L.S	1		
5.5.2	leakage/ crack injection in wet or damp conditions for Beit Ammra Elevated Tank. The price shall includes supply of all required materials, repair, injection in accordance with specifications, the supplier recommendations and the Engineer instructions.	L.S	1		
5.5.3	<b>Water Tightness Test No.2;</b> Carry out the leakage test for the reservoir by filling it completely with water for at least 24 hours as per specifications and to the approval of the Engineer and if the test failed he has to repair the leaks in tank at his own cost and re-test again to the satisfaction of the Engineer. The cost of water is to be included.	L.S	1		
5.5.4	Repair and apply one coats of water proofing Epoxy Resin for the internal walls, floor and ceiling of the tank using non-toxic coating with 100% solids (solvent free). The overall thickness is 100 Micron per coat (dry firm thickness). The price includes filling the pin holes, if exist at the surface of the fair face, by epoxy based putty before applying the water proofing coats, and to be used according to the instructions of the manufacturer. Epoxy shall not constitute a toxic hazards, shall not support microbial growth, shall not cause taste or odor, cloudiness or discoloration of water, and shall be approved by a recognized certifying authorities as being suitable for use in potable water supply systems. Standard BS 6920 or equivalent.	L.S	1		
5.5.5	<b>Flushing, washing, cleaning and disinfection,;</b> Allow for each and every expense for the complete cleaning & disinfection of the reservoir in accordance with General Technical Specifications (GTS).	L.S	1		

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<b>5 Complementary Works: Beit Ammra 500m3 Elevated Tank</b>					
5.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
5.5.6	Repair, Supply and apply epoxy coating for all existing pipes and steel elements within the site boundary. The works and price shall include the rusted and not coated steel materials only.	L.S	1		
5.6	<b>External Coats</b>				
5.6.1	Apply two protection coats for the external faces of the tank body, columns, bridges and stairs. The first coat should be a silane - siloxane (water repellent material) to fill capillaries as approved by the engineer and the manufacturer instructions. The final coat will be protective coating resistance to aggressive elements (sun and light) and has a gray color. This final coat will be two layers of water based acrylic protective coating with 200 Micron as a minimum total thickness for this coat. The price includes all concrete repair works , cracks and voids if exist, tie rods holes and voids using (Renderoc FC materials, rivestop or equivalent) according to the manufacturer instructions and engineer's approval.	Sq m	1650		
5.6.2	Roof Drains:				
	Supply, installation, fixing and commissioning of UPVC rainwater roof drain including connections, 3" UPVC rain water drain pipe from the roof up to ground level. Price to include also a cover of 20x20 cm stainless steel mesh. Price shall include all required fixing clamps, supports etc.	L.S	1		
5.6.3	Inlet/Outlet Chamber Drains:				
	Supply, installation, fixing, repair, clean, extend and commissioning of UPVC rainwater drain including connections, 3" UPVC rain water drain pipe from the Inlet/Outlet Chamber Drains to the boundary wall as shown on drawings. Price to include also a cover all the stainless steel mesh, excavation, bedding and backfilling and concrete encasement. Price shall include all required fixing clamps, supports etc.	L.S	1		
5.6.4	<b>Access Road</b>				
A	Excavation and Earthworks Excavation to specified or directed levels in all materials. Unclassified excavation in the cut sections of the road, including removing existing pavement layers ( in cut or fill sections), watercourses, ditches and Wade relocations and removing of subgrade material classified unsuitable all as and where shown on the drawings, including trimming & grading, mixing & shaping, watering, compaction, testing, all tests required, and hauling the excavated material either to locations for road embankments or to stockpiles or to waste, all according to specifications, drawings and/or as directed by the Engineer. (Note: Suitable Excavated materials to be used for embankment construction along the road will not be paid for as Embankment Materials such as filling layers or rock fill inclusive of processing, transportation and installation and any other works deemed necessary).	M3	250		
B	Base Course Supplying, spreading and compacting one layer of base coarse materials (grade A) for the access road, with 15cm thickness each layer to reach 100% of the maximum density with optimum moisture and compaction in accordance with the modified AASHTO F.D.T. (T-80), T-191 or equivalent standard. The unit price shall include excavating, grading, preparation of subgrade layer(compaction of Structural backfill for subgrade layer (excavated selected materials or imported approved materials)), backfilling, leveling, compacting and cleaning the site and removing the surplus material to a site approved by the Engineer.	Sq m	1250		
C	Asphalt Works Asphalt pavement on site (6 cm), ¾" asphalt mix design. Price includes Liquid Asphalt Prime Coat (Gird. MC. 70) 2 Kg. per square meter., mixed with the thinner on dry, smooth and clean surface. Asphalt shall be compacted to a minimum of 98% density in accordance with AASHTO F.D.T. (T-166) or T-230. Price shall include but, is not limited to; existing frame and manhole cover adjustment to match the new P.G.L where applicable, adjustment of private houses entrances etc.).	Sq m	500		
D	Road Marking: Continuous and/or intermittent Thermoplastic paint according to specifications and/or as directed by the Engineer.	Sq m	125		
<b>TOTAL Complementary Works: Beit Ammra 500m3 Elevated Tank</b>					

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<b>6. Complementary Works: School Reservoir 1000m3 Reservoir</b>					
6.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
6.1.1	Miscellaneous: Remove and clean School Reservoir and access road from all dirt, obstacles etc. This shall include the Elevated tank itself, the yard, any element within the site boundary, access road etc. The price shall also include the water which will be used for cleaning and transporting the collected dirt, obstacles etc to an approved location. The cleaning shall be done before starting any type of works and before the handing over of the project.	L.S	1		
6.2	<b>GENERAL - Civil Site Preparation</b>				
6.2.1	Supplying, spreading and compacting base coarse materials (grade A) for the area surrounding the reservoir, with 20cm thickness each layer to reach 100% of the maximum density with optimum moisture and compaction in accordance with the modified AASHTO F.D.T. (T-80), T-191 or equivalent standard. The unit price shall include excavating, grading, preparation of subgrade layer (compaction of Structural backfill for subgrade layer (excavated selected materials or imported approved materials)), backfilling, leveling, compacting and cleaning the site and removing the surplus material to a site approved by the Engineer. For the Yard below the Asphalt. The price shall include any excavation or leveling required to reach the required levels.	m3	350		
6.2.2	Asphalt pavement on site (7 cm), ¾" asphalt mix design. Price includes Liquid Asphalt Prime Coat (Gird. MC. 70) 2 Kg. per square meter., mixed with the thinner on dry, smooth and clean surface. Asphalt shall be compacted to a minimum of 98% density in accordance with AASHTO F.D.T. (T-166) or T-230.	sq m	840		
6.2.3	Supply and installation of Curb stone size 17 * 25 * 100 cm, including excavations and B300 concrete under the front stone with dimensions of (40 * 10) cm2 and reinforcement concrete behind the stones with dimensions of (15 * 15) cm (provided that it is not peppered) and a layer of Biscours with a thickness of 10 cm under the concrete, lining and painting on two layers or as needed and all that is needed according to the specifications, plans and instructions of the supervising engineer.	l.m	35		
6.3	<b>Mechanical Works</b>				
	Note: Price to include the supply and all required works to install the equipment properly as specified, shown on the drawings and directed by the engineer. The following should be considered: * Interior surfaces of all steel pipe fittings shall be lined with cement mortar lining. * External surfaces of all steel pipes, fittings shall be epoxy lined and painted at the factory according to AWWA C210. * All pipe diameters are inside diameter. * The flushing, washing, cleaning, disinfection and hydrostatic pressure testing shall be done before the connecting with existing Pipelines * Connecting the new water pipelines with the existing shall not be done unless Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning have been done and approved by engineer * The project materials to be provided to the Contractor are only the valves and electromagnatic flow meter.				
6.3.1	Inlet (Exposed Work ) Allow for each and every expense to supply and install and complete a 12 inch steel pipes, Sch40 welded and with internal colloidal concrete lining (8.0 mm) thickness according to P.S NO.325 PART 1 and External surfaces of all steel pipes, fittings shall be epoxy lined and painted at the factory according to AWWA C210 for pipes above ground. The price shall include supplying and installing all the required black steel fittings and accessories (pipe supports, elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, puddle flanged pipe, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the fixing and supporting the pipes with reservoir structure and support the inlet pipe with Concrete support. Unit prices shall also include execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. All work shall be as per specifications, Drawings and the Engineer instructions.	L.M	7		

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<b>6. Complementary Works: School Reservoir 1000m3 Reservoir</b>					
6.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
6.3.2	<p>Overflow Pipe (Exposed Work )</p> <p>Allow for each and every expense to supply and install a 10 Inch steel pipes, 5/32 " wall thickness steel pipes according to P.S NO.186 grade B, welded and with internal colloidal concrete lining (6.0 mm) thickness according to P.S NO.325 PART 1 and External surfaces of all steel pipes, fittings shall be epoxy lined and painted at the factory according to AWWA C210 for pipes above ground. All pipes and fittings under ground shall be PE coated with PN 16 fittings and accessories. The price shall include supplying and installing all the required black steel fittings and accessories (pipe supports, elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, puddle flanged pipe, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the fixing and supporting the pipes with reservoir structure. Unit prices shall include also flushing, washing, cleaning, disinfection and hydrostatic pressure test and all required necessary works according to GTS. All work shall be as per specifications, Drawings and Supervisor Engineer.</p>	L.M	2		
6.3.3	<p>Inlet/Outlet Pipe (under ground)</p> <p>Allow for each and every expense to supply and install a 12 Inch steel pipes, Sch40, welded and with internal colloidal concrete lining (8.0 mm) thickness according to P.S NO.325 PART 1 and external polyethylene external coating with minimum thickness of 1.8 mm according to P.S NO.325 PART 6 wrapping applied by the extrusion method with all required appurtenances with all fittings and accessories. The price shall include supplying and installing all the required black steel fittings and accessories (elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, plastic warning tape, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the Trench Excavation in all types of soil and rock to install one pipeline or more than one pipeline of potable water of different pipe diameters. Excavation shall cover clearing, grubbing of top soil , trimming bottoms and sides of trench to the depths and widths shown on drawings, removal and disposal of all excess material to locations acceptable to the Engineer. Price shall also include supplying and backfilling (surrounding the pipe) by using sand of PS421 or equivalent. Price shall also include supplying backfilling of the excavated trench depending on the type of the trench as shown on the Detailed drawings for different types of trenches. The Backfilling shall be in layers not exceeding 250 mm measured before compaction. The unit price shall include imported material as per technical specifications, compaction, and disposal of excavated material. Compaction tests and grain size analysis must be carried out each 150 m by the contractor and at his own expense. Unit prices shall include also Hydrostatic Pressure Testing, disinfection, flushing and all required necessary works according to GTS. All work shall be as per specifications, Drawings and Supervisor Engineer.</p>	L.M	25		
6.3.4	<p>Washout/ Overflow Pipe (under ground)</p> <p>Allow for each and every expense to supply and install a 10 inch steel pipes, 5/32 " wall thickness steel pipes according to P.S NO.186 grade B, welded and with internal colloidal concrete lining (6.0 mm) thickness according to P.S NO.325 PART 1 and external polyethylene external coating with minimum thickness of 1.8 mm according to P.S NO.325 PART 6 wrapping applied by the extrusion method with all required appurtenances with PN 16 fittings and accessories. The price shall include supplying and installing all the required black steel fittings and accessories (elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, plastic warning tape, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the Trench Excavation in all types of soil and rock to install one pipeline or more than one pipeline of potable water of different pipe diameters. Excavation shall cover clearing, grubbing of top soil , trimming bottoms and sides of trench to the depths and widths shown on drawings, removal and disposal of all excess material to locations acceptable to the Engineer. Price shall also include supplying and backfilling (surrounding the pipe) by using sand of PS421 or equivalent. Price shall also include supplying backfilling of the excavated trench depending on the type of the trench as shown on the Detailed drawings for different types of trenches. The Backfilling shall be in layers not exceeding 250 mm measured before compaction. The unit price shall include imported material as per technical specifications, compaction, and disposal of excavated material. Compaction tests and grain size analysis must be carried out each 150 m by the contractor and at his own expense. Unit prices shall include also Hydrostatic Pressure Testing, disinfection, flushing and all required necessary works according to GTS. All work shall be as per specifications, Drawings and Supervisor Engineer.</p>	L.M	50		



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<b>6. Complementary Works: School Reservoir 1000m3 Reservoir</b>					
6.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
6.3.5	Inlet/Outlet Connection with existing Pipes Allow for each and every expense to supply and install all required steel pipes and fittings from the same type of Steel Pipe (Tees, reducers, elbows, flanges, etc.) to connect with existing inlet and Outlet pipes. The price shall include all required works to connect proposed inlet pipe to existing transmission pipeline and connecting outlet with existing network. The price shall also include connecting and disconnecting with all required works such civil works (excavations, backfilling, reinstatement etc.), welding, cleaning, testing, etc.	L.S	1		
6.3.6	Supply and install 12 inch Stainless steel 316L inlet pipes Price shall include all required Stainless steel 316L fittings, accessories, flanges, bolts, etc.	L.M	7		
6.3.7	Supply and install and commission Hose Bibb and Rack system with al required pipes, valves, accessories and fittings etc. Project materials will only provide the Hose Bibb and Rack and valves.	L.S	1		
6.3.8	Furnish and install all reservoir mechanical equipment including all valves, hangers, fittings, float controls, magnetic flow meter and equipment to provide a complete and functional elevated reservoir and piping system within the site boundaries. The price shall also include all associated work outside of the site boundary. Pricing shall include all necessary excavation, backfilling, cleaning, testing, disinfection, commissioning and operations instruction and training for the mechanical systems. Price shall include supply and installation of all required accessories, elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, etc.). All shall be done in accordance with drawings and engineer instruction.	L.S	1		
6.3.9	Supply, paints, fixing and anchoring of the water level Indicator. The water level indicator consists of fix level gauge with 3 stage indicators and removable gauge. Pipes and all other part of the indicator inside the water tank to be painted by epoxy (non-toxic) coating with 100% solids (Solvent free) with 2 coat of 200-micron thickness per coat All in accordance with GTS, drawings and Engineers approval. Note: All pipe and parts inside the water tank shall be stainless steel (type 316). To be placed on concrete support.	L.S	1		
6.3.10	Supply and install a 4 to 20mA submersible hydrostatic water level sensor in tank, from 0 to 7m H2o, jacket is made from stainless steel, equipped with factory made flexible cable, to be connected to PLC/ RTU. Price shall include all required materils, wiring, works to fix properly and as instructed by the Engiener.	No.	1		
6.4	<b>Electrical Works</b>				
6.4.1	Installation Light pole: Installation of 6100mm galvanized (in accordance with ASTM A123M) pole octagonal reinforced shaft on a 15 base plate complete with 50 tubular lighting arm 1500 long and Lamp 70W H.P.S. The price include supply and installation all fittings (cable, pipes, bolts...etc.) to have a complete working job.	No.	3		
6.4.2	Furnish and installation of panels, wires, conduits, cables, lights and receptacles according to design drawings and specifications.	L.S	1		
6.4.3	Supply, install, connect and test water level switch- indicator. Price shall include all stainless steel clamps, stainless steel body and screw, stainless steel 1.5 inch pipe, control cabel connection, control cabel , junction box etc. All as drawings, specifications and Engineer instructions.	No.	1		
6.4.4	supply, install, connect, testing and commission of the exisitng distribution boards, complete with (mcb) circuit breakers (10KA), isolators, earth leakage C.B, distribution terminal blocks according to local electrical authority and according to drawings, specifications and relevant codes.				
A	KWHMB (excluding KWH meter only)	No.	1		
B	DB- Tank	No.	1		

N°	TITLE	UNIT	QUANTITIES	UNIT PRICE (NIS)	Total AMOUNT (NIS)
THE COSTS PROVIDED BY THE CONTRACTOR IN THIS BILL OF QUANTITIES ARE ALL INCLUSIVE FOR THE WORK DESCRIBED IN THE DRAWINGS AND SPECIFICATIONS, WHETHER SPECIFICALLY MENTIONED IN THE BELOW DESCRIPTIONS OR NOT.					
<b>6. Complementary Works: School Reservoir 1000m3 Reservoir</b>					
6.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
6.4.5	<p>Earthing System Supply, install, connect, test and commission a complete earthing system for the project including all conductors, termination to Main earth box, copper rods, cables, clamps, conduits, hand holds with heavy-duty cast-iron cover 25T, unit price also including excavation not less than (40H x 40w) cm and backfilling, backfill material, sand, warning tape, and all other needed materials, according to drawings, specification, local authority regulations, and Engineer approval and related codes as shown in Drawings. Work also include but not limited to:</p> <ul style="list-style-type: none"> <li>• Supply and install of one complete main earth box (40x40) cm oven painted metal box.</li> <li>• Supply and install of 30x3 mm galvanized steel strip welded each meter to foundation, and to be connected to earth box and all earthing manholes with 1x10 mm2 insulated copper earth cable.</li> <li>• Supply and install of 4 readymade manholes (Earth pits 40x40 cm with 19 mm diameter copper electrode, 1.5m length (for Earthing) with manhole cover 25 ton, including excavation, backfilling, backfill material, and all needed works for pit and trench according to the drawings, specifications and Engineer's instructions.</li> <li>• Supply and install of 10 mm2 insulated earthing cable and protected (inside 32 mm diameter PVC pipe) to be connected to all metal parts at the top of tank which is water pipes, hand rail, steel ladder, main earth box in MOB, distribution boards bodies .... etc.</li> <li>• Work also include supply and install of 32mm PVC pipe needed for the protection of the 10 mm2 insulated earthing cable.</li> </ul>	L.S	1		
6.4.6	Supply, install, test and commission 600 volts cables with all required accessories for proper installation, connection and operation, from KWHMB to electrical manhole at the main gate to reach the pole top (electricity source-selected in coordination with the service provider) as shown on drawing, as specifications and supervision engineer's requirements. The price includes all necessary work such as put not limit the following: excavation, backfilling, cutting, fixing, cables, conduits, pipes, testing, manholes. fees ... etc.				
	3x10 mm2 insulated cable For DB-Ground Floor	L.M	30		
6.4.7	Manhole				
	Supply, install, test and commission the following electrical, ready made reinforced concrete manhole including excavation and backfill material and all other needed materials according to drawing specifications and Engineer instructions. Manhole Dimension 60*40 cm ready made, with 25T heavy duty cast iron	No.	1		
6.4.8	Builders works for Trenches				
A	Supply, install, test, and commission the following builders work including excavation Not less than (60Hx40w) cm, backfilling, backfill material, sand, warning tape, and all other needed materials according to drawing specifications and Engineer instructions.	L.M	25		
B	Supply and install of 2*3" PVC Pipe	L.M	60		
6.4.9	Furnish and installation of RTU, RTU Panel and breaker Panel, electrical conduit and wire complete for RTU	L.S	1		
6.4.10	Supply and install SUN/Rain SHEILDS to protect the Electrical Panels and PIC. Price shall include a galvanized steel body, supports etc. The sun shield shall be design by the Contractor.	No.	1		
6.5	<b>Water Tests and repair</b>				
	<b>All tests shall be carried out and accepted prior to connecting to the existing. Those tests should be carried out in according with the specifications (GTS) and to the approval of the engineer.</b>				
6.5.1	<p><b>Water Tightness Test No.1;</b> Carry out the leakage test for the reservoir by filling it completely with water for at least 24 hours as per specifications and to the approval of the Engineer and if the test failed he has to repair the leaks in tank at his own cost and re-test again to the satisfaction of the Engineer. The cost of water is to be included.</p>	L.S	1		
6.5.2	Repair and apply one coats of water proofing Epoxy Resin for the internal walls, floor and ceiling of the tank using non-toxic coating with 100% solids (solvent free). The overall thickness is 100 Micron per coat (dry firm thickness). The price includes filling the pin holes, if exist at the surface of the fair face, by epoxy based putty before applying the water proofing coats, and to be used according to the instructions of the manufacturer. Epoxy shall not constitute a toxic hazards, shall not support micobial growth, shall not cause taste or odor, cloudiness or discoloration of water, and shall be approved by a recognized certifying authorities as being suitable for use in potable water supply systems. Standard BS 6920 or equivalent.	L.S	1		



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<b>6. Complementary Works: School Reservoir 1000m3 Reservoir</b>					
6.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
6.5.3	<b>Flushing, washing, cleaning and disinfection,;</b> Allow for each and every expense for the complete cleaning & disinfection of the reservoir in accordance with General Technical Specifications (GTS).	L.S	1		
6.5.4	<b>External Coats</b>				
	Apply two protection coats for the external faces of the tank body, columns, bridges and stairs. The first coat should be a silane - siloxane (water repellent material) to fill capillaries as approved by the engineer and the manufacturer instructions. The final coat will be protective coating resistance to aggressive elements (sun and light) and has a gray color. This final coat will be two layers of water based acrylic protective coating with 200 Micron as a minimum total thickness for this coat. The price includes all concrete repair works , cracks and voids if exist, tie rods holes and voids using (Renderoc FC materials, rivestop or equivalent) according to the manufacturer instructions and engineer's approval.	Sq m	460		
6.5.5	<b>Roof Drains:</b>				
	Supply, installation, fixing and commissioning of UPVC rainwater roof drain including connections, 3" UPVC rain water drain pipe from the roof up to ground level. Price to include also a cover of 20x20 cm stainless steel mesh. Price shall include all required fixing clamps, supports etc.	L.S	1		
<b>TOTAL Complementary Works: School Reservoir 1000m3 Reservoir</b>					

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<b>7. Complementary Works: Khalet Salaem Reservoir 5000m3 Reservoir</b>					
7.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
7.1.1	Miscellaneous: Remove and clean Khalet Salaem Reservoir and access road from all dirt's, obstacles etc. This shall include the Elevated tank itself, the yard, any element within the site boundary, access road etc. The price shall also include the water which will be used for cleaning and transporting the collected dirt's, obstacles etc. to an approved location. The cleaning shall be done before starting any type of works and before the handing over of the project.	L.S	1		
7.2	<b>GENERAL - Civil Site Preparation</b>				
	<b>Note: The Contractor shall prepare all required shop drawings, designs and survey for the base Corse and asphalt works after defining the final required level and getting approval of the Engineer.</b>				
7.2.1	Supplying, spreading and compacting base coarse materials (grade A) for the area surrounding the reservoir, with 20cm thickness each layer to reach 100% of the maximum density with optimum moisture and compaction in accordance with the modified AASHTO F.D.T. (T-80), T-191 or equivalent standard. The unit price shall include excavating, grading, preparation of subgrade layer(compaction of Structural backfill for subgrade layer (excavated selected materials or imported approved materials)), backfilling, leveling, compacting and cleaning the site and removing the surplus material to a site approved by the Engineer. For the Yard below the Asphalt. The price shall include any excavation or leveling required to reach the required levels.	m3	2000		
7.2.2	Asphalt pavement on site (6 cm), ¾" asphalt mix design. Price includes Liquid Asphalt Prime Coat (Gird. MC. 70) 2 Kg. per square meter., mixed with the thinner on dry, smooth and clean surface. Asphalt shall be compacted to a minimum of 98% density in accordance with AASHTO F.D.T. (T-166) or T-230.	sq m	1200		
7.2.3	Supply and installation of Curb stone size 17 * 25 * 100 cm, including excavations and B300 concrete under the front stone with dimensions of (40 * 10) cm2 and reinforcement concrete behind the stones with dimensions of (15 * 15) cm (provided that it is not peppered) and a layer of Biscours with a thickness of 10 cm under the concrete, lining and painting on two layers or as needed and all that is needed according to the specifications, plans and instructions of the supervising engineer.	l.m	35		
7.4	<b>Mechanical Works</b>				
	Note: Price to include the supply and all required works to install the equipment properly as specified, shown on the drawings and directed by the engineer. The following should be considered: * Interior surfaces of all steel pipe fittings shall be lined with cement mortar lining. * External surfaces of all steel pipes, fittings shall be epoxy lined and painted at the factory according to AWWA C210. * All pipe diameters are inside diameter. * The flushing, washing, cleaning, disinfection and hydrostatic pressure testing shall be done before the connecting with existing Pipelines * Connecting the new water pipelines with the existing shall not be done unless Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning have been done and approved by engineer * The project materials to be provided to the Contractor are only the valves and electromagnetic flow meter.				
7.4.1	Inlet (Exposed Work ) Allow for each and every expense to supply and install and complete a 10 inch steel pipes, Sch40 welded and with internal colloidal concrete lining (8.0 mm) thickness according to P.S NO.325 PART 1 and External surfaces of all steel pipes, fittings shall be epoxy lined and painted at the factory according to AWWA C210 for pipes above ground. The price shall include supplying and installing all the required black steel fittings and accessories (pipe supports, elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, puddle flanged pipe, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the fixing and supporting the pipes with reservoir structure and support the inlet pipe with Concrete support. Unit prices shall also include execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. All work shall be as per specifications, Drawings and the Engineer instructions.	L.M	12		

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<b>7. Complementary Works: Khalet Salaem Reservoir 5000m3 Reservoir</b>					
7.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
7.4.2	<p>Overflow Pipe (Exposed Work )</p> <p>Allow for each and every expense to supply and install a 10 Inch steel pipes, 5/32 " wall thickness steel pipes according to P.S NO.186 grade B, welded and with internal colloidal concrete lining (6.0 mm) thickness according to P.S NO.325 PART 1 and External surfaces of all steel pipes, fittings shall be epoxy lined and painted at the factory according to AWWA C210 for pipes above ground. All pipes and fittings under ground shall be PE coated with PN 16 fittings and accessories. The price shall include supplying and installing all the required black steel fittings and accessories (pipe supports, elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, puddle flanged pipe, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the fixing and supporting the pipes with reservoir structure. Unit prices shall include also flushing, washing, cleaning, disinfection and hydrostatic pressure test and all required necessary works according to GTS. All work shall be as per specifications, Drawings and Supervisor Engineer.</p>	L.M	4		
7.4.3	<p>Inlet (under ground)</p> <p>Allow for each and every expense to supply and install a 12 Inch steel pipes, Sch40, welded and with internal colloidal concrete lining (8.0 mm) thickness according to P.S NO.325 PART 1 and external polyethylene external coating with minimum thickness of 1.8 mm according to P.S NO.325 PART 6 wrapping applied by the extrusion method with all required appurtenances with all fittings and accessories. The price shall include supplying and installing all the required black steel fittings and accessories (elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, plastic warning tape, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the Trench Excavation in all types of soil and rock to install one pipeline or more than one pipeline of potable water of different pipe diameters. Excavation shall cover clearing, grubbing of top soil , trimming bottoms and sides of trench to the depths and widths shown on drawings, removal and disposal of all excess material to locations acceptable to the Engineer. Price shall also include supplying and backfilling (surrounding the pipe) by using sand of PS421 or equivalent. Price shall also include supplying backfilling of the excavated trench depending on the type of the trench as shown on the Detailed drawings for different types of trenches. The Backfilling shall be in layers not exceeding 250 mm measured before compaction. The unit price shall include imported material as per technical specifications, compaction, and disposal of excavated material. Compaction tests and grain size analysis must be carried out each 150 m by the contractor and at his own expense. Unit prices shall include also Hydrostatic Pressure Testing, disinfection, flushing and all required necessary works according to GTS. All work shall be as per specifications, Drawings and Supervisor Engineer.</p>	L.M	40		
7.4.4	Dittu but for the /Outlet Pipe 12 Inch	L.M	40		
7.4.5	<p>Washout/ Overflow Pipe (under ground)</p> <p>Allow for each and every expense to supply and install a 8 inch steel pipes, 5/32 " wall thickness steel pipes according to P.S NO.186 grade B, welded and with internal colloidal concrete lining (6.0 mm) thickness according to P.S NO.325 PART 1 and external polyethylene external coating with minimum thickness of 1.8 mm according to P.S NO.325 PART 6 wrapping applied by the extrusion method with all required appurtenances with PN 16 fittings and accessories. The price shall include supplying and installing all the required black steel fittings and accessories (elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, plastic warning tape, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the Trench Excavation in all types of soil and rock to install one pipeline or more than one pipeline of potable water of different pipe diameters. Excavation shall cover clearing, grubbing of top soil , trimming bottoms and sides of trench to the depths and widths shown on drawings, removal and disposal of all excess material to locations acceptable to the Engineer. Price shall also include supplying and backfilling (surrounding the pipe) by using sand of PS421 or equivalent. Price shall also include supplying backfilling of the excavated trench depending on the type of the trench as shown on the Detailed drawings for different types of trenches. The Backfilling shall be in layers not exceeding 250 mm measured before compaction. The unit price shall include imported material as per technical specifications, compaction, and disposal of excavated material. Compaction tests and grain size analysis must be carried out each 150 m by the contractor and at his own expense. Unit prices shall include also Hydrostatic Pressure Testing, disinfection, flushing and all required necessary works according to GTS. All work shall be as per specifications, Drawings and Supervisor Engineer.</p>	L.M	30		

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<b>7. Complementary Works: Khalet Salaem Reservoir 5000m3 Reservoir</b>					
7.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
7.4.6	Service Pipe (underground) Allow for each and every expense to supply and install a 8 Inch steel pipes, Sch40, welded and with internal colloidal concrete lining (6.0 mm) thickness according to P.S NO.325 PART 1 and external polyethylene external coating with minimum thickness of 1.8 mm according to P.S NO.325 PART 6 wrapping applied by the extrusion method with all required appurtenances with all fittings and accessories. The price shall include supplying and installing all the required black steel fittings and accessories (elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, plastic warning tape, etc.) The price shall also include but not limited transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings. The price shall also include the Trench Excavation in all types of soil and rock to install one pipeline or more than one pipeline of potable water of different pipe diameters. Excavation shall cover clearing, grubbing of top soil , trimming bottoms and sides of trench to the depths and widths shown on drawings, removal and disposal of all excess material to locations acceptable to the Engineer. Price shall also include supplying and backfilling (surrounding the pipe) by using sand of PS421 or equivalent. Price shall also include supplying backfilling of the excavated trench depending on the type of the trench as shown on the Detailed drawings for different types of trenches. The Backfilling shall be in layers not exceeding 250 mm measured before compaction. The unit price shall include imported material as per technical specifications, compaction, and disposal of excavated material. Compaction tests and grain size analysis must be carried out each 150 m by the contractor and at his own expense. Unit prices shall include also Hydrostatic Pressure Testing, disinfection, flushing and all required necessary works according to GTS. All work shall be as per specifications, Drawings and Supervisor Engineer.	L.M	110		
7.4.7	Inlet/Outlet Connection with existing Pipes Allow for each and every expense to supply and install all required steel pipes and fittings from the same type of Steel Pipe (Tees, reducers, elbows, flanges, etc.) to connect with existing inlet and Outlet pipes. The price shall include all required works to connect proposed inlet pipe to existing transmission pipeline and connecting outlet with existing network. The price shall also include connecting and disconnecting with all required works such civil works (excavations, backfilling, reinstatement etc.), welding, cleaning, testing, etc.	L.S	1		
7.4.8	Supply and install 10 inch Stainless steel 316L inlet pipes Price shall include all required Stainless steel 316L fittings, accessories, flanges, bolts, etc.	L.M	12		
7.4.9	Supply and install 12 inch Stainless steel 316L inlet pipes Price shall include all required Stainless steel 316L fittings, accessories, flanges, tees, bolts, etc.	L.M	15		
7.4.10	Supply and install 8 inch Stainless steel 316L inlet pipes Price shall include all required Stainless steel 316L fittings, accessories, flanges, tees, bolts, etc.	L.M	12		
7.4.11	Supply and install and commission Hose Bibb and Rack system with al required pipes, valves, accessories and fittings etc. Project materials will only provide the Hose Bibb and Rack and valves.	L.S	1		
7.4.12	Furnish and install all reservoir mechanical equipment including all valves, hangers, fittings, float controls, magnetic flow meter and equipment to provide a complete and functional elevated reservoir and piping system within the site boundaries. The price shall also include all associated work outside of the site boundary. Pricing shall include all necessary excavation, backfilling, cleaning, testing, disinfection, commissioning and operations instruction and training for the mechanical systems. Price shall include supply and installation of all required accessories, elbows, reducers ,tees, end caps, couplers, flange adapters, transition unions with other pipes, etc.). All shall be done in accordance with drawings and engineer instruction.	L.S	1		
7.4.13	Supply, paints, fixing and anchoring of the water level Indicator. The water level indicator consists of fix level gauge with 3 stage indicators and removable gauge. Pipes and all other part of the indicator inside the water tank to be painted by epoxy (non-toxic) coating with 100% solids (Solvent free) with 2 coat of 200-micron thickness per coat All in accordance with GTS, drawings and Engineers approval. Note: All pipe and parts inside the water tank shall be stainless steel (type 316). To be placed on concrete support.	L.S	1		
7.4.14	Supply and install a 4 to 20mA submersible hydrostatic water level sensor in tank, from 0 to 7m H2o, jacket is made from stainless steel, equipped with factory made flexible cable, to be connected to PLC/ RTU. Price shall include all required materials, wiring, works to fix properly and as instructed by the Engineer.	No.	1		
7.4.15	Supply and install the washout outfall drain. The price shall include excavation, backfilling and all works and materials as shown on the drawings.	No.	1		
7.5	<b>Electrical Works</b>				
7.5.1	Installation Light pole: Installation of 6100mm galvanized (in accordance with ASTM A123M) pole octagonal reinforced shaft on a 15 base plate complete with 50 tubular lighting arm 1500 long and Lamp 70W H.P.S. The price include supply and installation all fittings (cables, pipes, bolts...etc.) to have a complete working job. Price shall also include supply and cast on site a reinforced concrete foundation with all bolts, supports and wires.	No.	4		

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<b>7. Complementary Works: Khalet Salaem Reservoir 5000m3 Reservoir</b>					
7.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
7.5.2	Furnish and installation of panels, wires, conduits, cables, lights and receptacles according to design drawings and specifications.	L.S	1		
7.5.3	Supply, install, connect and test water level switch- indicator. Price shall include all stainless steel clamps, stainless steel body and screw, stainless steel 1.5 inch pipe, control cable connection, control cable, , junction box etc. All as drawings, specifications and Engineer instructions.	No.	1		
7.5.4	supply, install, connect, testing and commission of the existing distribution boards, complete with (mcb) circuit breakers (10KA), isolators, earth leakage C.B, distribution terminal blocks according to local electrical authority and according to drawings, specifications and relevant codes.				
A	KWHMB (excluding KWH meter only)	No.	1		
B	DB- Tank	No.	1		
7.5.5	<p>Earthing System</p> <p>Supply, install, connect, test and commission a complete earthing system for the project including all conductors, termination to Main earth box, copper rods, cables, clamps, conduits, hand holds with heavy-duty cast-iron cover 25T, unit price also including excavation not less than (40H x 40w) cm and backfilling, backfill material, sand, warning tape, and all other needed materials, according to drawings, specification, local authority regulations, and Engineer approval and related codes as shown in Drawings. Work also include but not limited to:</p> <ul style="list-style-type: none"> <li>• Supply and install of one complete main earth box (40x40) cm oven painted metal box.</li> <li>• Supply and install of 30x3 mm galvanized steel strip welded each meter to foundation, and to be connected to earth box and all earthing manholes with 1x10 mm2 insulated copper earth cable.</li> <li>• Supply and install of 4 readymade manholes (Earth pits 40x40 cm with 19 mm diameter copper electrode, 1.5m length (for Earthing) with manhole cover 25 ton, including excavation, backfilling, backfill material, and all needed works for pit and trench according to the drawings, specifications and Engineer's instructions.</li> <li>• Supply and install of 10 mm2 insulated earthing cable and protected (inside 32 mm diameter PVC pipe) to be connected to all metal parts at the top of tank which is water pipes, hand rail, steel ladder, main earth box in MOB, distribution boards bodies .... etc.</li> <li>• Work also include supply and install of 32mm PVC pipe needed for the protection of the 10 mm2 insulated earthing cable.</li> </ul>	L.S	1		
7.5.6	Supply, install, test and commission 600 volts cables with all required accessories for proper installation, connection and operation, from KWHMB to electrical manhole at the main gate to reach the pole top (electricity source-selected in coordination with the service provider) as shown on drawing, as specifications and supervision engineer's requirements. The price includes all necessary work such as put not limit the following: excavation, backfilling, cutting, fixing, cables, conduits, pipes, testing, manholes. fees ... etc.				
A	3x10 mm2 insulated cable For DB-Ground Floor	L.M	30		
7.5.7	Manhole				
A	<p>Supply, install , test and commission the following electrical, ready made reinforced concrete manhole including excavation and backfill material and all other needed materials according to drawing specifications and Engineer instructions.</p> <p>Manhole Dimension 60*40 cm ready made, with 25T heavy duty cast iron</p>	No.	1		
7.5.8	Builders works for Trenches				
A	Supply, install, test, and commission the following builders work including excavation Not less than (60Hx40w) cm, backfilling, backfill material, sand, warning tape, and all other needed materials according to drawing specifications and Engineer instructions.	L.M	25		
B	Supply and install of 2*3" PVC Pipe	L.M	60		
7.5.9	Furnish and installation of RTU, RTU Panel and breaker Panel, electrical conduit and wire complete for RTU	L.S	1		
7.5.10	Supply and install SUN/Rain SHEILDS to protect the Electrical Panels and PIC. Price shall include a galvanized steel body, supports etc. The sun shield shall be design by the Contractor.	No.	1		
7.6	<b>Water Tests and repair</b>				
	<b>All tests shall be carried out and accepted prior to connecting to the existing. Those tests should be carried out in according with the specifications (GTS) and to the approval of the engineer.</b>				
7.6.1	<p><b>Water Tightness Test No.1;</b></p> <p>Carry out the leakage test for the reservoir by filling it completely with water for at least 24 hours as per specifications and to the approval of the Engineer and if the test failed he has to repair the leaks in tank at his own cost and re-test again to the satisfaction of the Engineer. The cost of water is to be included.</p>	L.S	1		

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<b>7. Complementary Works: Khalet Salaem Reservoir 5000m3 Reservoir</b>					
7.1	<b>GENERAL - SITE PREPARATION AND MISCELLANEOUS WORK</b>				
7.6.3	<b>Flushing, washing, cleaning and disinfection,;</b> Allow for each and every expense for the complete cleaning & disinfection of the reservoir in accordance with General Technical Specifications (GTS).	L.S	1		
7.6.4	<b>Internal Water Proofing</b> Repair and Apply two coats of water proofing Epoxy Resin for the internal walls, floor and ceiling of the tank using non-toxic coating with 100% solids (solvent free). The overall thickness is 200 Micron per coat (dry film thickness). The price includes filling the pin holes, if exist at the surface of the fair face, by epoxy based putty before applying the water proofing coats, and to be used according to the instructions of the manufacturer. Epoxy shall not constitute a toxic hazards, shall not support microbial growth, shall not cause taste or odor, cloudiness or discoloration of water, and shall be approved by a recognized certifying authorities as being suitable for use in potable water supply systems. Standard BS 6920 or equivalent.	M <sup>2</sup>	2400		
7.6.5	<b>External Coats</b> Repair and Apply two protection coats for the external faces of the tank body, columns, bridges and stairs. The first coat should be a silane - siloxane (water repellent material) to fill capillaries as approved by the engineer and the manufacturer instructions. The final coat will be protective coating resistance to aggressive elements (sun and light) and has a gray color. This final coat will be two layers of water based acrylic protective coating with 200 Micron as a minimum total thickness for this coat. The price includes all concrete repair works , cracks and voids if exist, tie rods holes and voids using (Renderoc FC materials, rivestop or equivalent) according to the manufacturer instructions and engineer's approval.	Sq m	2400		
7.6.6	<b>Roof Drains:</b> Supply, installation, fixing and commissioning of UPVC rainwater roof drain including connections, 3" UPVC rain water drain pipe from the roof up to ground level. Price to include also a cover of 20x20 cm stainless steel mesh. Price shall include all required fixing clamps, supports etc.	L.S	1		
7.6.7	Supplying and fixing stainless steel internal ladder (type 316) (Max. 12m )for reservoir as shown on drawing and approved by the Engineer . The price includes all the necessary parts required to finish the job as per the drawings and specifications including plates, expansion, anchors, bolts, welding material...etc. The ladder has to be unable to grow up microbes, non-toxic when in touch with water. To not have side effect on the water or its taste. To be placed on concrete support.	No.	2		
7.6.8	applying, fixing and painting (3 coats) External Hot Dip Galvanized Steel Ladder (Around 13 meter) with the arrangement needed to prevent unauthorized climbing (lockable part of the ladder) and fixation as shown on drawings . Price shall also include the steel rests landing (3 steel rests landing), safety cage, bolts, anchors, beams, all structural elements required, welding material, galvanized steel protection, galvanized steel plates, price to also include the supporting landing, ladder supporting as shown in the drawings and details. All in accordance with GTS drawings and Engineer's approval. To be placed on concrete support.	L.S	1		
7.6.9	Supplying , fixing and painting galvanized steel handrail on the top of the parapet around the roof slab of reservoir as per specification and drawings	L.M	160		
<b>TOTAL Complementary Works: Khalet Salem Reservoir 5000m3 Reservoir</b>					

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<b>8. SCADA Works for WBWD</b>					
8.1	<b>SCADA equipment in chambers</b>				
8.1.1	Supply, installation and connection of compact low power RTU/Datalogger; battery or solar powered, operated by 24VDC including 3G modem with 8 Digital inputs, 4 Digital output, 4 Analog input. With time synchronization, and SMS features and Email Alert sending, to send the data to the main SCADA room at WBWD. RTU shall have configurable cycle for data acquisition and for sending the Data. Battery should be 26 Ah and able to last for at least 2 years before replacing the battery cells. and including mounting in IP68 aluminium enclosure, cabling and all the necessary accessories, cable glands, wiring, fixing complete for operation.	Unit	6		
8.1.2	Supply, installation and connection of compact low power RTU/Datalogger; battery or solar powered, operated by 24VDC including 3G modem with 8 Digital inputs, 4 Digital output, 4 Analog input. With time synchronization, and SMS features and Email Alert sending, to send the data to the main SCADA room at WBWD. RTU shall have configurable cycle for data acquisition and for sending the Data. Battery should be 26 Ah and able to last for at least 2 years before replacing the battery cells. and including mounting in IP68 aluminium enclosure, cabling and all the necessary accessories, cable glands, wiring, fixing complete for operation.	Unit	6		
8.1.3	Supply and installation of Communication Equipment: (3G) antenna IP68 certified and all the necessary accessories, wiring, fixing complete for operation	Unit	6		
8.1.4	Supply and installation of spare lithium Battery stands, for 7 year autonomy as a minimum	Unit	12		
8.2	<b>Programming</b>				
8.2.1	Allow for every work and expenses to do the Programming of the new equipemnt to WBWD SCADA system. Price shall also include all needed software complete for operation.	L.S	1		
<b>TOTAL SCADA Works for WBWD</b>					



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<b>SCADA Works for Yatta Municipality</b>					
9.1	<b>SCADA equipment at Beit Ammra Elevated Tank</b>				
9.1.1	Supply, installation and connection of PLC Equipment, complying with the Technical Specifications, equipped with deported I/O modules for 22 digital inputs, 8 analogic inputs, 10 digital outputs and 1 analogic output, and power supply card, including mounting in cabinet, electric protections, cabling with related equipment and general electric cabinet, trenches and all the necessary accessories. The PLC shall be connected simultaneously (one too Yatta municipality & one to WBWD) to TWO 3G communication processors (modems) which is the next BOQ item	Unit	1		
9.1.2	Supply and installation of Communication Equipment: 3G antenna IP68 certified and all the necessary accessories	Unit	2		
9.1.3	Supply , install and connect a 0,5 kVA safety power supply including battery charger for a 12 hour battery as a minimum, device against deep discharges, protection against the inversions of polarity, presence detection battery, periodic test of capacity of the battery, cabling and all the necessary accessories.	Unit	1		
9.1.4	Supply , install and connect a Human Machine Interface (7" HMI) graphic screen, including cabling and all the necessary accessories if any.	Unit	1		
9.2	<b>SCADA equipment at Khalet Salem Tank</b>				
9.2.1	Supply, installation and connection of PLC Equipment, complying with the Technical Specifications, equipped with deported I/O modules for 22 digital inputs, 8 analogic inputs, 10 digital outputs and 1 analogic output, and power supply card, including mounting in cabinet, electric protections, cabling with related equipment and general electric cabinet, trenches and all the necessary accessories. The PLC shall be connected simultaneously (one too Yatta municipality & one to WBWD) to TWO 3G communication processors (modems) which is the next BOQ item	Unit	1		
9.2.2	Supply and installation of Communication Equipment: 3G antenna IP68 certified and all the necessary accessories	Unit	2		
9.2.3	Supply , install and connect a 0,5 kVA safety power supply including battery charger for a 12 hour battery as a minimum, device against deep discharges, protection against the inversions of polarity, presence detection battery, periodic test of capacity of the battery, cabling and all the necessary accessories.	Unit	1		
9.2.4	Supply , install and connect a Human Machine Interface (7" HMI) graphic screen, including cabling and all the necessary accessories if any.	Unit	1		
9.3	<b>SCADA equipment at School Tank</b>				
9.3.1	Supply, installation and connection of PLC Equipment, complying with the Technical Specifications, equipped with deported I/O modules for 22 digital inputs, 8 analogic inputs, 10 digital outputs and 1 analogic output, and power supply card, including mounting in cabinet, electric protections, cabling with related equipment and general electric cabinet, trenches and all the necessary accessories. The PLC shall be connected simultaneously (one too Yatta municipality & one to WBWD) to TWO 3G communication processors (modems) which is the next BOQ item	Unit	1		
9.3.2	Supply and installation of Communication Equipment: 3G antenna IP68 certified and all the necessary accessories	Unit	2		
9.3.3	Supply , install and connect a 0,5 kVA safety power supply including battery charger for a 12 hour battery as a minimum, device against deep discharges, protection against the inversions of polarity, presence detection battery, periodic test of capacity of the battery, cabling and all the necessary accessories.	Unit	1		
9.3.4	Supply , install and connect a Human Machine Interface (7" HMI) graphic screen, including cabling and all the necessary accessories if any.	Unit	1		
9.4	<b>SCADA Workstation</b>				
9.4.1	Supply, install and connect SCADA Workstation, Xeon E3-1275 v5 (4C/8T, 3.6 (4.0) GHz, 8 MB Cache); MB (Chipset C236, 1x DVI-D, 2x DisplayPort V1.2, 4x USB 3.0 & 4x USB 2.0 rear, 1x USB 2.0 internal, 1x COM1; RAID onboard; iAMT) / RAID1, 1 TB (2x 1 TB HDD), internally mounted, (0.2 g vibration, 1 g shock) / 16 GB DDR4 SDRAM (2x 8 GB), Dual Channel / Housing blue chromated, 2x 100/240 V AC redundant industrial power supply, DVD±RW (slim) / graphics onboard / Interfaces: 2x USB 3.0 front, 2x Gbit Ethernet, 2x PS/2, Audio; 5x PCI-Express, 2x PCI; Temperature and fan control; Watchdog; board retainer / Windows Server 2019 Standard Edition 64 Bit, incl. 5 Clients Multi-Language (En, De, Fr, It, Sp) + Office Pro 2019 including cabling and all the necessary accessories	Unit	1		
9.4.2	Supply and configure Monitoring Web based Client access with all necessary licenses	Unit	1		
9.4.3	Supply, install and connect 32" LCD Monitor including cabling and all the necessary accessories	Unit	1		
9.4.4	Supply and install QWERTY Keyboard and optical Mouse	Unit	1		
9.4.5	Supply, install and connect A4 color laser printer including cabling and all the necessary accessories	Unit	1		
9.4.6	Supply, install and connect a PLC to monitor the control center and workstation status (10 digital input as a minimum) including 3G modem for SMS alarming	Unit	1		
9.4.7	Supply, install and connect Uninterruptible Power Supply (UPS) and all the necessary accessories, with a 1 kVA capacity, to support the main equipment of the workstation for 4 hours as a minimum, and to manage a 50% increase in load.	Unit	1		
9.4.8	Ethernet Switch	Unit	1		
9.4.9	Router/Switch w/Redundant Power Supply	Unit	1		



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<b>SCADA Works for Yatta Municipality</b>					
9.1	<b>SCADA equipment at Beit Ammra Elevated Tank</b>				
9.4.10	Firewall	Unit	1		
9.5	<b>Software &amp; License</b>				
9.5.1	SCADA Runtime Software & Licenses package for 512 tags	Unit	1		
9.5.2	Required software for connecting remote sites (Tanks) to the SCADA	Unit	1		
9.5.3	VPN Software & License	Unit	1		
9.5.4	PLC Programming License	Unit	1		
9.5.5	SCADA programming license for 512 Tags	Unit	1		
9.6	<b>Initial Training</b>				
9.6.1	Initial Training (System Operators, System Supervisors, System developers)	Unit	1		
9.7	<b>Programming</b>				
9.7.1	Allow for every work and expenses to do the Programming of the new equipemnt and new SCADA system. Price shall also include all needed software and hardware complete for operation.	Unit	1		
9.8	<b>Testing, commissioning and training</b>				
9.8.1	Site training	Unit	1		
9.8.2	Factory Acceptance Test	Unit	1		
9.8.3	1 year assistance for Operation and Maintenance	Unit	1		
9.8.4	O&M manuals	Unit	1		
9.8.5	2 years Spare parts	Unit	1		

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<b>10. Supply and Installation of Yatta Water Supply System- Extension Areas</b>					
<b>10.1 Excavation Works</b>					
	Unit prices of all items of earth works shall include the following: Cleaning the site from all surplus back-fill material, results of excavation and dispose of excess material to locations acceptable to the Engineer and local authorities. Contractor must provide all safety measures at working sites according to PWA AND OSHA requirement * The Engineer and Employer have the right to give part of the steel pipes for the Contractor to use and deduct its price from the Contractor. * the Rout * A. The pipe routs and locations of the pipes and valves are tentatives . The Engineers and Yatta Municipality will mark the final routs and locations during the walk thorough and the shop drawings which will be prepared by the Contractor. The Contractor have no rights to claim or object. B. The works and Price of the Contractor shall include the connection and disconnection of pipe with old and new network. C. The As build provided to the Contractor might have some wrong information. The Contractor shall be fixable and will not have the rights to claim or object. D. The Contractor shall keep the existing network functional during the works and shall programme his work according to Yatta Municipality instructions				
	Excavate in all types of soil and rock according to the contract drawings and to the technical specifications stating by Clearing, grubbing of top soil , specified in the General Technical Specifications and up to the satisfaction of the Engineer. Excavation in asphalted areas must start by using asphalt cutting machine , compressors or hand excavating might be needed for the narrow roads or any needed place ,to reach the minimum depth and width required in the drawings . Dispose all excess material to locations acceptable to the Engineer and related authorities. All related works of this item and trench width should be implemented in accordance to General Technical Specifications and Drawings.				
10.1.1	Trench Excavation for Pipe Diameter 6 inch with excavation depth not less than 1200mm	L.M	2800		
10.1.2	Trench Excavation for Pipe Diameter 4 inch with excavation depth not less than 950mm	L.M	1065		
10.1.3	Trench Excavation for Pipe Diameter 3 inch with excavation depth not less than 930mm	L.M	5310		
10.1.4	Trench Excavation for Pipe Diameter 2 inch with excavation depth not less than 900mm	L.M	1450		
10.1.5	Trench Excavation for Pipe Diameter 1 inch with excavation depth not less than 825mm	L.M	2000		
<b>10.2 Trench backfilling (Soft and Final Backfilling )</b>					
	Allow for every expenses and works to supply and backfill the excavated trench backfilling (Soft and Final Backfilling ). The works shall be done in two stages:				
	Soft Backfilling: supplying and backfilling (surrounding the pipe) By using sand (Single Size-Smsm) according to PS421 or equivalent . This material shall be placed 150 mm below the invert level up to 200 mm over the crown of the pipe and for the full width of the trench .The pipes should be supported on sacks filled with sand 150 mm height every 15m .The work shall be completed according to the drawings, general technical specifications and Engineer's approval.				
	Final backfilling :of the excavated trench by supplying and backfilling of the excavated trench depending on the type of the trench as shown on the Detailed drawings for different types of trenches. The Backfilling shall be in layers not exceeding 250 mm. The unit price shall include imported material as per technical specifications, compaction, and disposal of excavated material. Compaction tests and grain size analysis must be carried out each 150 m by the contractor and at his own expense according to AASHTO T191, T180 or equivalent. The price also include supply and install plastic blue warning tape marked "water pipe" one continuous layer over water pipe minimum thickness 0.1 mm. The unit price must cover concrete encasement for pipes crossing main roads, or sewers, or concrete over pipes, installed in very low depth caused by unseen obstacles and where needed and/ or requested by the supervising engineer and using warning tapes.				
10.2.1	Trench backfilling for Pipe Diameter 6 inch	L.M	2800		
10.2.2	Trench backfilling for Pipe Diameter 4 inch	L.M	1065		
10.2.3	Trench backfilling for Pipe Diameter 3 inch	L.M	5310		
10.2.4	Trench backfilling for Pipe Diameter 2 inch	L.M	1450		
10.2.5	Trench backfilling for Pipe Diameter 1 inch	L.M	2000		
<b>10.3 Supply and Install of Steel Pipe Works</b>					
	GENERAL Notes: Supply, Installation of pipes and associated fittings. Costs will include connections to the Existing main and distribution pipes, where needed. The Unit price shall include all the related works .All shall be done in accordance with Specification, drawings and instructions of the engineer.				
10.3.1	Supply of Steel Pipes and Fittings				

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	Supply of 6 Inch steel pipes and fittings, 5/32" wall thickness steel pipes according to P.S No.186 grade B, welded end with internal colloidal concrete lining (6.0 mm) thickness according to P.S No.325 part 1 and external layer polyethylene coating with minimum thickness of 1.5 mm according to P.S No.325 part 6 wrapping applied by the extrusion method with all required appurtenances with PN 16 fittings and accessories . Pipes must be medium series, and length of each pipe 12.2 m, and stamp with Palestinian supervision mark or Palestinian quality mark or equivalent on each pipe for the production of the pipe itself. The price shall include supplying all the required black steel fittings and accessories (elbows, reducers , end caps, flange adapters, etc.) and supply of heat shrinkable sheets. The price shall also include but not limited to Supply of coupling every 12-18m for future customers, transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings.	L.M	2800		
10.3.2	Ditto but Supply of 4 Inch steel pipes and fittings with internal colloidal concrete lining (6.0 mm) and external layer polyethylene coating with minimum thickness of 1.5mm	L.M	1065		
10.3.3	Ditto but Supply of 3 Inch steel pipes and fittings with internal colloidal concrete lining (4.0 mm) and external layer polyethylene coating with minimum thickness of 1.5mm	L.M	5310		
10.3.4	Installation of Steel Pipes and Fittings				
	Installation of 6 Inch Steel Pipe and accessories. The price shall include spreading pipes along the route of pipelines, welding the steel pipe (to be done only by a certified welder), welded joints must be wrapped by using heat shrinkable sheet where needed or according to the instructions of the Engineer. Price shall also include welding /fixing of readymade elbows, tees acts... all according to the instructions of the supervisor. and to locate them on site. The damaged outside ( must be cleaned and repaired according to the manufacture recommendations and Engineer's instructions . Rate should also includes connection of the new pipe lines with the existing pipelines, installation of all types of fittings accessories (tees, elbows, adaptors, saddles, etc...) pipe laying, commissioning installation of all types of fittings (tees, elbows, adaptors, etc...), pipe laying all as per drawings and PWA specifications, GTS,engineer's approval, and contract conditions. The price shall also include but not limited to installation of coupling every 12-18m for future customers.	L.M	2800		
	Unit prices shall also include execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. All work shall be as per specifications, Drawings and the Engineer instructions.				
10.3.5	Ditto but for Installation of 4 Inch steel pipes and fittings.	L.M	1065		
10.3.6	Ditto but for Installation of 3 Inch steel pipes and fittings.	L.M	5310		
<b>10.4 Supply and Install of Galvanized steel pipes works</b>					
	GENERAL Notes : Unit prices of item shall include the following: 1- Supply and Install of all required fittings(elbows, tees, couplings, nipples ,etc.). 2- Costs will include connections to the Existing main and distribution pipes, where needed. The Unit price shall include all the related works .All shall be done in accordance with Specification, drawings and instructions of the engineer. 3- Cost includes execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS.				
10.4.1	Supply of Galvanized steel pipes works				
	Supply of 2 Inch Galvanized and threaded steel pipes with a wall thickness of (3.65mm) in accordance to PS141 or equivalent. The pipes shall be wrapped from outside with a layer of PE applied by the extrusion method. 1.5mm thickness in accordance to PS325-6. The pipes shall be stamped with Palestinian supervision mark or Palestainin quality mark or equivalent. The price shall include supplying all the required Galvanized and threaded steel fittings and accessories (elbows, tees, couplings, nipples, transition unions with other pipes, etc.) and supply heat shrinkable tapes. The price shall also include but not limited to transportation and unloading of the pipes to site storage yard, and all required works for the supply of the pipes and its fittings and supply of coupling every 12-18m for future customers. The pipe length shall be 6m each.	L.M	1450		
10.4.2	Ditto but for Supply of 1 Inch Galvanized steel pipes and fittings.	L.M	2000		
10.4.3	Installation of Galvanized steel pipes works				

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	Installation of 2 Inch Galvanized Threaded steel pipes complete including but not limited to: spreading pipes, laying of pipes, installation of all required fittings(elbows, tees, couplings, nipples ,ets.) and all required works to complete installation of pipeline .rate should also includes connections of the new pipe lines with the existing pipe lines in the network, installation must be by using the couplings and lowering inside the ditches 50mm nominal diameter threaded galvanized steel pipe lines, including of the fittings needed ( threaded elbows, records, nipples, couplings, plugs, unions, bends..etc.).and heated shrinkable tapes, cutting ,shaping, connecting existing network, making new threads and installing of elbows as needed so as the line will be always in the center line of the trench including wrapping the joints and the damaged outside wrapping. Work shall be completed according to the contract conditions, General technical specifications and the Engineer's approval. The price shall also include but not limited to installation of coupling every 12-18m for future customers	L.M	1450		
	Unit prices shall also include execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. All work shall be as per specifications, Drawings and the Engineer instructions.				
10.4.4	Ditto but for Installation of 1 Inch Galvanized steel pipes and fittings.	L.M	2000		
<b>10.5 Reinstatement Works</b>					
	Restore (as before excavation) similar to existing conditions (asphalt, base corse, concrete etc.) as before excavation for roads and off-roads water pipe lines routes and house connection , including removal of soil layers, and moving the excavated material either to approved location or to waste, all according to specifications and as directed by the Supervisor. The reinstatement shall be done in accordance with the specifications and the Engineer instructions. Asphalt pavement shall be compacted to 98% according to AASHTO T 166 or AASHTO T230 or equivalent. Spraying 2 kg of prime coat (MCO) per each square meter over the compacted base course, and applying a layer of asphalt mix of size ¾" , in a thickness not less than 50mm, after compaction which should satisfy the specification of Palestinian Ministry of Public Works.	L.M	12625		
<b>10.6 Valve Works</b>					
10.6.1	Threaded Gate valves in Service Box				
	Supply and install 2 Inch bronze threaded gate valves (non rising stem) , (PN 20 bar min W.P) with hand wheel for each valve complete with all required accessories. All in accordance with EN 12288 or equivalent. The price shall also include but not limited to the following : excavation in all types of soil or rocks, supplying and installing the B250 ready made concrete manhole complete with a 25 ton cast iron cover according to EN124 or equivalent, fittings, gravel hole for surplus water, backfilling under and around the manhole with single size, blinding concrete B200 and reinstatement to original conditions. Unit prices shall also include also execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. Buried concrete surfaces should be isolated with two layers of cold bituminous protective coating with 1000mm thickness for each layer. All work shall be as per specifications, Drawings and the Engineer instructions.	No.	8		
10.6.2	Ditto but for 1 Inch bronze threaded gate valves	No.	14		
10.6.3	Non Threaded Gate Valves Chambers				
	supply and install cast iron wedge gate valves non toxic factory epoxy internally and externally coated, complete with flanges, gaskets, bolts and nuts, non rising stem, with hand wheel for each valve. All in accordance with ISO No.5752, EN1074 parts 1, 2 , EN 1171 or equivalent. . Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-300 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, rings, dressers with tie rods 600mm long, diameter of 5/8 and 4 ears for each dresser. Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve, fittings, concrete support, 60cm opening cast iron heavy duty frame and cover (40 ton), concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to construct the gate valves chambers as specified in the contract drawings, GTS and Engineer approval.				
	Unit prices shall also include execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. All work shall be as per specifications, Drawings and Supervisor Engineer. Buried concrete surfaces should be isolated with two layers of cold bituminous protective coating with 1000mm thickness for each layer. All work shall be as per specifications, Drawings and the Engineer instructions.				
10.6.4	PN25, 6 Inch Gate valve chamber	No.	1		
10.6.5	PN25, 4 Inch Gate valve chamber	No.	1		
10.6.6	PN25, 3 Inch Gate valve chamber	No.	4		
10.6.7	Washout				

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	Supply and install Washout in Chamber on 6 Inch Pipe. Supply and install cast iron wedge 6 Inch gate valves non toxic factory epoxy internally and externally coated, complete with flanges, gaskets, bolts and nuts, non rising stem, with hand wheel for each valve. All in accordance with ISO No.5752, EN1074 parts 1, 2, EN 1171 or equivalent. . Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-300 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size, rings, dressers with tie rods 600mm long, diameter of 5/8 and 4 ears for each dresser. Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, gate valve, fittings, concrete support, 60cm opening cast iron heavy duty frame and cover (40 ton), concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to construct the gate valves chambers as specified in the contract drawings, GTS and Engineer approval. Price shall also include washout outfall in urban areas type 1 as shown on drawings with all works, pipes, excavation, backfilling, reinstatement etc.	No.	2		
10.6.8	Combination Air Release Valve				
	Supply and install PN16 2" air Valve unit, with 2" gate valve PN16 on the main transmission pipeline diameter 6 inch, cast iron body, double (automatic and kinetic air valve), combination air valve (3 functions air release during filling, admission of air during drainage and air release during operation in pressurized system) for 16 bar (W.P) , complete with flanges, gaskets, bolts and nuts, non toxic factory epoxy coated, according to EN 1074-4 or equivalent. The gate valve shall be non rising stem, with hand wheel , all in accordance with EN 12288 or equivalent . Work also include excavation in all types of soil or rocks, blinding concrete B200, reinforced concrete B-300 kg/cm2 for base slab, walls and roof, protective coat (asphalt) for the concrete manhole, backfilling under and around the manhole with single size. Epoxy coating for all metals inside manhole, ventilation, fittings manhole rungs, concrete support, heavy duty, 60cm clear opening cast iron heavy duty frame and cover (40 ton), concrete paving, backfilling and compaction and reinstatement the rate should allow for each and every expense to construct the air valves chambers as specified in the contract drawings, GTS and Engineer approval.	No.	1		
	Unit prices shall also include execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. All work shall be as per specifications, Drawings and the Engineer Instructions. Buried concrete surfaces should be isolated with two layers of cold bituminous protective coating with 1000mm thickness for each layer. All work shall be as per specifications, Drawings and the Engineer instructions.				
10.6.9	Supply and install air release valve Units on 2 Inch steel pipe. the Air valve shall be metal body or equivalent, double (automatic and kinetic air valve) combination Air valve (3 functions air release during filling, admission of air during drainage and air release during operation in pressurized system). The price shall also include threaded gate valves (non rising stem) , (PN 20 bar min W.P) with hand wheel for each valve complete with all required accessories. All in accordance with EN 12288 or equivalent. The price shall also include but not limited to the following : excavation in all types of soil or rocks, supplying and installing the B250 ready made concrete manhole complete with a 25 ton cast iron cover according to EN124 or equivalent, fittings, gravel hole for surplus water, backfilling under and around the manhole with single size, blinding concrete B200 and reinstatement to original conditions. Unit prices shall also include also execute Hydrostatic Pressure Testing, disinfection, flushing, washing and cleaning and approved by engineer for new pipes before connecting with the existing pipes and all required necessary works according to GTS. Buried concrete surfaces should be isolated with two layers of cold bituminous protective coating with 1000mm thickness for each layer. All work shall be as per specifications, Drawings and the Engineer instructions.	No.	1		
<b>10.7 Concrete Encasement</b>					
	Supply and cast in place plain Concrete Grade B '150', including all related works for pipes crossing main roads, or concrete over pipes installed in very low depth caused by unseen obstacles and where needed and supply and cast in place reinforced concrete in sewer pipe line crossing . All shall be done in accordance with Drawings, GTS and only when requested by the Engineer	m3	50		
<b>TOTAL Supply and Installation of Yatta Water Supply System- Extension Areas</b>					

N°	TITLE	UNIT	QUANTITIES	UNIT PRICE (NIS)	Total AMOUNT (NIS)
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<b>11. Supply of Spare Parts</b>					
			<b>Conditional</b>	<b>Conditional</b>	<b>Conditional</b>
11.1	Allow for each and every expense to supply spare parts for Yata Munciaplity warehouse. The work shall include loading and unloading. The specification shall be as per General and particular Specification and the material used in the project. The contractor shall provide detailed specification and catalogues for the spare parts material and get the approval on the spare parts from the Engineer.				
11.2	100 mm nominal diameter pressure steel pipes, 3.96 mm wall thickness, type (Grade) B with colloidal concrete lining from inside 4 mm thickness, and a layer of PE applied by the extrusion method 1.5mm thickness wrapping from outside. Length of each pipe =12.2m, with the (Tehen Stamp or equivalent) on each pipe (for the pipe itself and the lining and the wrapping). All in accordance with Section (4) - Clauses concerning steel pipes of the (GTS) and PS. No. (186.), 325, 325 part (1), and 325 part (6) or equivalent.	L.M	1000.4		
11.3	Supply of 2 Inch Galvanized and threaded steel pipes with a wall thickness of (3.65mm) in accordance to PS141 or equivalent. The pipes shall be wrapped from outside with a layer of PE applied by the extrusion method. 1.5mm thickness in accordance to PS325-6. The pipes shall be stamped with Palestinian supervision mark or Palestainin quality mark or equivalent.	L.M	4500		
11.4	Supply of 1 Inch Galvanized and threaded steel pipes with a wall thickness of (3.65mm) in accordance to PS141 or equivalent. The pipes shall be wrapped from outside with a layer of PE applied by the extrusion method. 1.5mm thickness in accordance to PS325-6. The pipes shall be stamped with Palestinian supervision mark or Palestainin quality mark or equivalent.	L.M	3000		
11.5	Ditto, but for ¾" pressure steel pipes, 2.65mm wall thickness.	L.M	900		
11.6	Ditto, but for 1/2" pressure steel pipes, 2.65mm wall thickness.	L.M	1800		
11.7	6" cast iron wedge gate valve for 16 Bar working pressure (W.P).-Epoxy coated. Complete with flanges, gaskets, bolts and nuts, (Non rising stem) with hand wheel for each valve. All in accordance with ISO Standard No. 5996 or equivalent.	No.	10		
11.8	Ditto but for 4" cast iron wedge gate valve for 16 Bar working pressure (W.P).	No.	10		
11.9	Ditto but for 3" cast iron wedge gate valve for 16 Bar working pressure (W.P).	No.	6		
11.10	(2")Copper threaded gate valve (non rising stem) for 20 Bar (W.P) in accordance with BS. No.5154, EN 12288 or equivalent.	No.	100		
	2" Brass ball valve 16 bar (W.P) in accordance with BS. No.5154, EN 12288 or equivalent.	No.	25		
11.11	1" Brass ball valve 16 bar (W.P) in accordance with BS. No.5154, EN 12288 or equivalent (externally threaded).	No.	300		
11.12	Ditto but for 1/2" valve (externally threaded)..	No.	200		
11.13	2" Galvanized steel plug in accordance with EN10242 & ISO Standard No. 9001 or equivalent.	No.	150		
11.14	Ditto but for 1" Galvanized steel plug.	No.	300		
11.15	Ditto but for 3/4" Galvanized steel plug.	No.	100		
11.16	Ditto but for 1/2" Galvanized steel plug.	No.	150		
11.17	(2") Galvanized steel conical record (6° shifting dgree) in accordance with EN10242 & ISO Standard No. 9001 or equivalent.working pressure 20 bar.	No.	100		
11.18	(1") Galvanized steel conical record (6° shifting dgree) in accordance with EN10242 & ISO Standard No. 9001 or equivalent.working pressure 20 bar.	No.	300		
11.19	Ditto but for 3/4"Conical Record	No.	100		
11.20	Ditto but for 1/2"Conical Record	No.	300		
11.21	(2") Galvanized steel compression couplings in accordance with EN10242 & ISO Standard No. 9001 or equivalent.	No.	300		
11.22	Ditto but for 1" Galvanized steel compression couplings	No.	300		
11.23	(2")*90 Galvanized steel threaded elbow in accordance with EN10242 & ISO Standard No. 9001 or equivalent.working pressure 20 bar.	No.	300		
11.24	(1")*90 Galvanized steel threaded elbow in accordance with EN10242 & ISO Standard No. 9001 or equivalent.working pressure 20 bar.	No.	300		
11.25	Ditto but for 3/4"elbow	No.	150		
11.26	Ditto but for 1/2"elbow	No.	300		
11.27	(2")*90° Galvanized steel threaded straight elbow in accordance with EN10242 & ISO Standard No. 9001 or equivalent.working pressure 20 bar.	No.	300		
11.28	Ditto but for 1"straight elbow.	No.	300		
11.29	Ditto but for 3/4"straight elbow.	No.	150		
11.30	Ditto but for 1/2"straight elbow.	No.	350		
11.31	Galvanized threaded steel "T" 2" /2" with EN10242 & ISO Standard No. 9001 or equivalent.working pressure 20 bar.	No.	100		
11.32	Ditto but for "T" 1" /1.	No.	100		
11.33	Ditto but for "T" 2" /1.	No.	100		
11.34	Ditto but for "T" 1" /1/2.	No.	100		
11.35	Galvanized steel reducer from 2"-1"(sch. 40) in accordance with ASTM. A234	No.	300		
11.36	Ditto but for Galvanized steel reducer from 1"-1/2"	No.	400		
11.37	Ditto but for Galvanized steel reducer from 1/2"-3/4"	No.	100		
11.38	(2") Galvanized steel coupler (sch. 40) (muffa) with EN10242 & ISO Standard No. 9001 or equivalent.working pressure 20 bar.	No.	100		
11.39	Ditto but for "1 galvanized coupler (muffa)	No.	200		
11.40	Ditto but for "3/4 galvanized coupler (muffa)	No.	100		

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11.41	Ditto but for "1/2 galvanized coupler (muffa)	No.	200		
11.42	(2") Galvanized steel nipple( 5-10 cm lengths) (SCH.40) in accordance with ASTM. A106	No.	300		
11.43	Ditto but for "1 galvanized steel nipple	No.	300		
11.44	Ditto but for "3/4 galvanized steel nipple	No.	150		
11.45	Ditto but for "1/2 galvanized steel nipple	No.	400		
11.46	Copper nipple 20mm/ 3/4" externaly threaded.	No.	150		
11.47	Ditto but for 20mm/ "1/2 Copper nipple	No.	150		
11.48	Copper union 20mm*20mm.	No.	200		
11.49	2" threaded double (automatic and kinetic) air valve (combination of air vacuum and release valve) for 16 Bar (W.P) -Epoxy coated, according to EN 1074-4 or equivalent.	No.	5		
11.50	6" Dresser (Dismantling joint )for (16) Bar (W.P) complete with two tie rods 600mm long, diameter of 5/8" and 4 ears for each dresser.	No.	10		
11.51	Ditto but 4" Dresser (Dismantling joint )	No.	10		
11.52	Ditto but 3" Dresser (Dismantling joint )	No.	10		
11.53	6" Flanged Coupling Adapter for (16) Bar (W.P) complete with bolts and nuts.		5		
11.54	Ditto but 4" Flanged Coupling Adapter .		5		
11.55	Ditto but 3" Flanged Coupling Adapter .		5		
11.56	Mchanical Flanged "2 Flow Meter PN16 Complete with flanges, gaskets, bolts and nuts .	No.	10		
11.57	Oil filled Pressure Gauge 40 bar 1/2 inch PN25	No.	10		
11.58	Oil filled Pressure Gauge 25 bar 1/2 inch PN25	No.	10		
11.59	Cast iron manhole cover 60cm Diameter 40 tons (with water logo )	No.	10		
11.60	Precast fair face service box manhole, Elliptical shape of 0.60 m internal largest diameter ,0.85m height & 10cm wall thickness , B300 with cast iron cover 25 tones 34 cm opening.	No.	50		
11.61	welding rods 3.25-610 (5kg pack)	No.	10		
11.62	Bitumen Spray can 425mg black bitum undercoat protection for water pipes insullation.	No.	200		
<b>TOTAL Supply of Spare Parts</b>					



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<b>12 Provisional Sum Item</b>					
12.1	The PWA reserves the right for carrying additional testing for any part of the works included in the contract, during and/or after the execution of the work. in the event that the result of such tests are not satisfactory and not in conformity with the specifications requirements, the contractor shall bear the costs and any other implications of such tests. On the other hand if the results of the additional tests prove to be satisfactory the "direct costs" of carrying such tests will be covered and paid through a "provisional sum item".	L.S	1	15,000.00	15,000.00
<b>TOTAL Provisional Sum Item</b>					15,000.00